

AIN SHAMS UNIVERSITY
INSTITUTE OF POSTGRADUATE
CHILDHOOD STUDIES.
(Medical Department)

" POLIOMYELITIS IN EGYPT

IN THE LAST 10 YEARS

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صها الدراسات العليا للطفولة
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To my Father and Mother

I always try to deserve being their daughter

To my Husband , Son and Daughter

Their loving , understanding , patient support
was of endless value.



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I N T R O D U C T I O N

Poliomyelitis is a viral disease which can be acquired by droplet route through ingestion (enterovirus).

Polio seems to have been endemic in Egypt since ancient times. Van Rooyen and Morgan (1943) stated that, polio existed in Ancient Egypt and typical paralytic cases were recorded in their drawings.

Awareness of polio as a public health problem developed during the 1940's and 1950's when increasing numbers of paralytic cases in infants and children were recognized.

(Schonberger, 1981)

No epidemics occurred in Egypt because infants and children had the opportunity of coming in contact with all 3 types of polio virus early in their life. Accordingly , they either had the disease or acquired silent immunity at an early age. This resulted in a high immune population in which the youngest infants and children were the most susceptible.

(Ibrahim, 1984)

Despite the obligatory use of TOPV (trivalent oral polio vaccine) for more than 25 years, polio is still consid-

ered a major health problem in Egypt. Polio is a paralytic disease with many bad social and psychological effects on affected persons, together with reflections on the Egyptian economy due to the disability of the patients and the high expenses of rehabilitation.

Massive vaccination campaigns (MVC) started in 1976 , but unfortunately there was still rising in the number of cases recorded by the IPR (Institute of Polio and Rehabilitation) since (1977) till recorded 2006 cases in (1980).

(Annual Report, 1980)

People became aware and acknowledged the severity of the disease through the various means of communications which played an important role during the MVC confronting the public with facts about the disease .

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AIM OF THE WORK

The aim of this work is to compare between the incidence of paralytic poliomyelitis in Egypt, in the 1st half of this decade(1980 ---- 1984) to the 2nd half(1985---1990), and to evaluate the role of the massive vaccination campaigns (MVC) and mass media campaigns in the prevention and control of the disease in Egypt.

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P O L I O M Y E L I T I S

It is an acute viral infection of the spinal cord and brain stem, which in its severe form leads to neuron destruction and irreversible muscular paralysis, and in 10% of the paralytic forms to death.

(Silver et al., 1980)

The name: Poliomyelitis (polios, grey ; myelos, marrow or spinal cord), is descriptive of the pathologic lesions involving neurons in the grey matter, especially, in the anterior horn of the spinal cord. Other obsolete names for the disease include infantile paralysis or Heine-Medin disease.

(Young, 1981)

EPIDEMIOLOGY

The natural history of polio is far from being completely understood. It occurs epidemically and endemically, choosing the less developed tropical and subtropical countries to be the place of its endemic pattern. Major epidemics can occur in places that have been practically free of polio for many years and that have high overall immunity.

The epidemiological pattern varies from a place to another.

(Schonberger, 1984)

In Egypt the disease is endemic with no epidemic outbreaks.

(Bloomfield, 1958)

Although poliovirus vaccines have been available almost for three decades, and great effort has been expended to extend their use, it is estimated that approximately 500,000 cases per year are still occurring in developing countries in subtropical and tropical areas, in which adequate immunization programs have not yet been established.

(Salk, 1983)

Man is the only natural host of human poliovirus. It is spread from person to person by fecal-oral and possibly oral-oral (respiratory) routes. Poliovirus has been recovered from trapped flies, and it is probable that this carriage contributes to the spread of human infection, particularly in lower socioeconomic population.

(Cherry, 1983)

AETIOLOGY

Poliovirus is a picornavirus of the enterovirus genus occurring in three distinct serotypes. The family picorna-

viridae consists of small, single stranded RNA viruses with cubical symmetry and having typically 42 capsomeres. They are about 27 nm in diameter and are so named because of their size and nucleic acid content (pico: small + RNA).

(Walter & Israel, 1987)

The virion consists of a single strand of messenger-sense RNA enclosed in a capsid made up of 60 copies of each of the four structural proteins VP₁, VP₂, VP₃ and VP₄.

(Kitamura et al., 1981)

A collaborative effort of many investigators established that polioviruses belong to only 3 distinct serologic types named : Type I, Type II and Type III.

(Committee on typing, 1951)

The three antigenic serotypes were originally known as Brunhilde, Lansing and Leon, but are now called type I, II, III. These three types are readily distinguished by neutralization tests, although some cross-immunity between them does occur, especially between type I and II. Infection with type I may induce some heterogenous neutralizing antibodies against type II, and the reverse is also true, but these facts are probably of minor epidemiological importance. Second attacks of polio are rare, and when they occur, are usually due to type I or II.

(Christie , 1987)

The work of Rubin, Weller and Enders (1952) indicated the tissue culture era that revolutionized all further studies on poliomyelitis. Tissue cultures provided :-

1. Simple in vitro procedures for the isolation, identification and typing of the polioviruses as well as for determination of antibodies.

(Robbins et al., 1951)

2. New informations on the nature and epidemiology of the disease including the fact that other enteroviruses (Coxsackie & Echo) can be the cause of the so-called "non-paralytic poliomyelitis" and occasionally persistent paralytic and fatal poliomyelitis.
3. The possibility of demonstrating that polioviruses of different neurovirulence exist in nature and that polioviruses with different capacities for multiplication in the nervous system, alimentary tract and other extraneural tissues can be artificially selected in the laboratory.

(Sabin, 1965)

4. The basis for development of both killed (Salk) and live-attenuated (Sabin) poliovirus vaccine.

Polioviruses contain no lipid in the cell envelope and are therefore resistant to ether, detergents and bile salts. They are stable at pH 3.0 a property which, along with resistance to bile salts may have much to do with their passage

through the stomach and duodenum and multiplication in the intestine. They are readily destroyed by heat, most strains at 50°C and probably all at 60°C for 30 minutes.

(Christie, 1987)

Hence adequate pasteurization of milk destroys the virus, which can survive for days at room temperature, for weeks at +4°C and indefinitely when frozen at -30°C.

(Kaplan & Melnick, 1952)

They are readily killed by drying, so that freeze-drying is not a satisfactory method of preservation. Polioviruses are rapidly killed by formalin, oxidising agents and chlorine.

(Arya, 1982)

They are rapidly inactivated by ultraviolet radiation, while they are resistant to all known antibiotics and chemotherapeutics.

(Sergiescu et al., 1972)

Most strains can be grown in primary or continuous cell line culture derived from variety of human tissues or monkey kidney, testis or muscle, but not in cells of lower animals.

(Jawetz et al., 1980)

Poliovirus multiplies only in cultured primate cells having specific receptor sites. Assembly of viral RNA

and capsid proteins takes place in the cytoplasm of the cell and the mature viron is released by cell lysis. New virus first appears within 3-4 hours, but release in quantity from a cell monolayer and the appearance of cytopathic changes occur later.

(Brown & Wilson, 1984)

Complement fixing (CF) antigens are known for each of the poliovirus serotypes. They may be prepared from tissue culture or infected C.N.S. Two type-specific antigens are contained in poliovirus preparations and can be detected by precipitin and CF tests. They are called N (nature) or D and H (heated) or C .

(Fields et al., 1985)

NEUTRALIZATION OF POLIOVIRUS :

Despite extensive studies over three decades, the mechanism of poliovirus neutralization is still unclear. Two classical models have been proposed:

- (i) A single hit mechanism, i.e. the reaction of one antibody molecule per- virion;
- (ii) A multi-hit mechanism, i.e. the reaction of more than one antibody molecule per- virion.

(Wetz, et al., 1986)

In the previous two mechanisms, the antibody remains

bound to the (clusters of) neutralized virions. A third mechanism of hit and run was described:

(iii) At low ionic strength, the 35 - 1f 4 antibody neutralizes the virus by a hit- and- run mechanism : the virions are converted to non-infections, empty capsids devoid of antibodies. These empty capsids resembled those formed by thermal denaturation of native poliovirus in their sedimentation coefficient (80 S), antigenicity (H) and isoelectric pH (6.3).

(Brioen et al., 1985)

PATHOGENESIS

Following initial entrance of virus by the oral or respiratory route, implantation occurs in the pharynx and the lower alimentary tract. Within one day, the infection extends to the regional lymph nodes. Fig (1).

(Cherry, 1987)

If it is not arrested at this stage, it enters the general circulation via the lymphatics and it then multiplies in various extraneural sites like the spleen and kidneys. This marks the end of the incubation period which usually lasts 7 - 14 days, but may extend up to 30 days. The viraemic phase is accompanied by a febrile

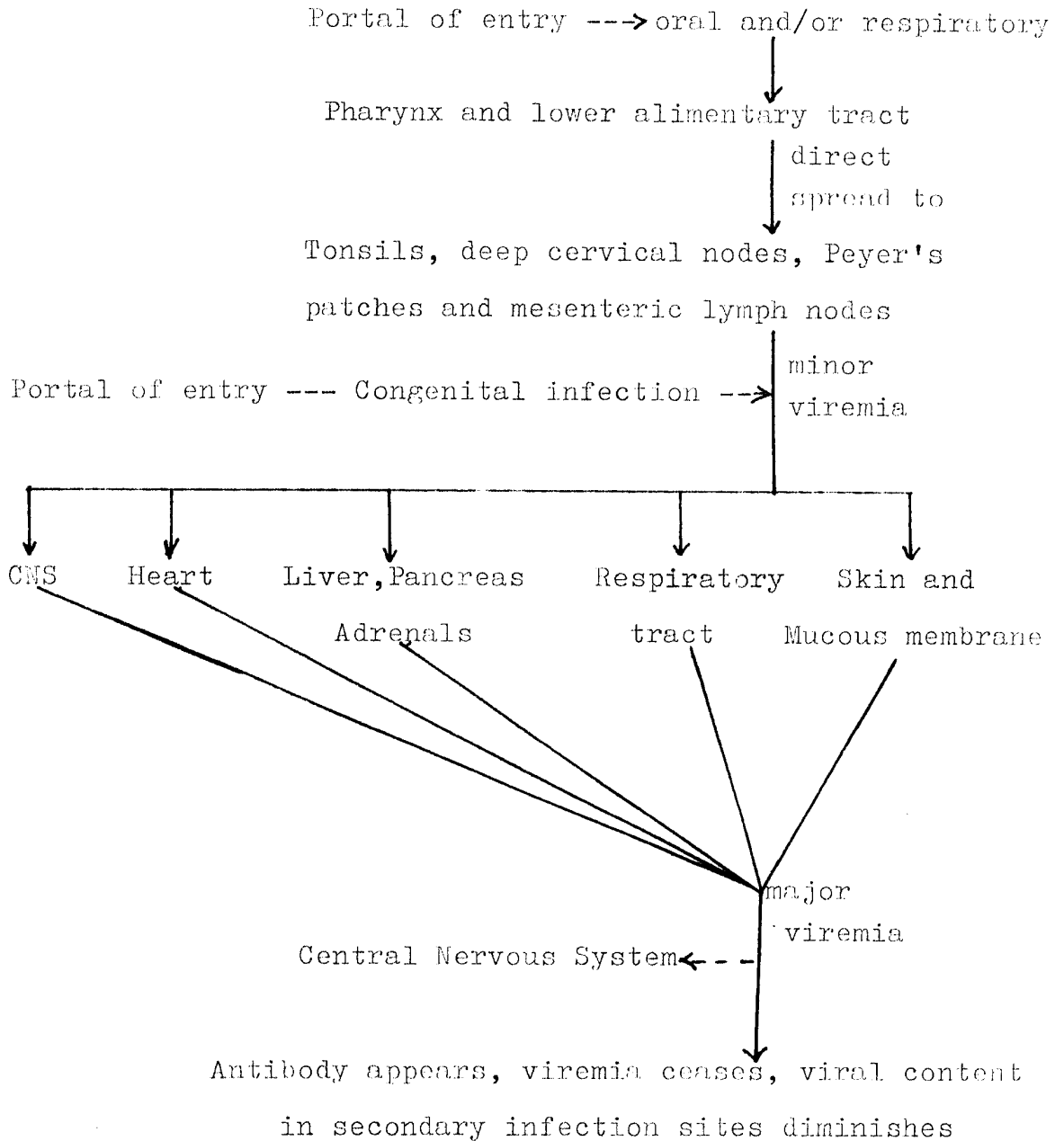


Fig. (1) : The pathogenesis of enteroviral infections.

(Cherry , 1976)

reaction, and even at this stage the infection may be overcome. If the condition proceeds, the virus settles finally in the CNS which it reaches by the blood stream. It localizes itself specifically in the anterior horn cells and their medullary counterparts, and paralysis ensues, if the cells are killed this is permanent.

(Walter & Israel, 1987)

A second mode of spread is directly up the peripheral nerve endings of the bowel and especially the pharynx. Opinions vary about the importance of this method of spread; it probably accounts for the bulbar type of disease that sometimes follows tonsillectomy.

(Malloran, 1987)

The effect of trauma, such as an injection on the incidence of paralysis after viraemia, seems to be linked with increased vascularity in that part of the spinal cord subserving the site of the injection, for the trauma not only increases the risk of paralysis, but also localizes it. There is experimental evidence that such increased vascularity does occur, but this proves only that virus can leak out of the blood to the central nervous system, it does not prove that this is normally the case.

(Christie, 1987)

Whether the virus ever reaches the C.N.S. by either route may depend on the genetic pattern of the infected

person: there is some evidence that HLA- encoded factors may perhaps influence resistance to paralytic form of poliomyelitis. (VanEden et al., 1983)

Faecal excretion of virus usually precedes the advent of symptoms by a few days and it is usually present during the first 2 weeks of paralytic manifestations. After about 6 weeks only a quarter of patients still excrete the virus and by 12 weeks excretion has usually ceased. Permanent carriage is unknown. The virus can be isolated from the throat just before and after the onset of symptoms. It cannot usually be isolated from the cerebrospinal fluid. (Walter & Israel, 1987)

Predisposing Factors :

After polio infection, certain factors predispose to invasion of the CNS, and the location and extent of injury :

1. Mouth & throat surgery: tonsillectomy, adenoidectomy and tooth extraction.
2. Inoculations (S.C or I.M.): especially of antigenic prophylactics (active immunizations) as diphtheria toxoid & pertussis vaccine.
3. Excessive muscular exercise & fatigue.
4. Pregnancy (in non-endemic areas) probably due to some endocrine factor. (Khalil, 1988)

PATHOLOGY

The most remarkable aspect of histopathology of poliomyelitis is the very high selectivity of the virus for nervous tissues. Virus is commonly present in the blood stream of people infected with poliovirus, but it causes very little, if any, changes in the tissues of the body as long as it remains outside the central nervous system. Once inside, it enters the nerve cells and causes rapid, widespread damage in the CNS.

(Christie, 1987)

Paralysis occurs from the viral action on the cells, not from the pressure of oedematous exudate, and indeed oedema is not a constant feature, death may occur in patients severely paralysed, yet autopsy reveals little infiltration or vascular changes in the spinal cord. On the other hand, marked perivascular cuffing may be present months after the affected nerve cell has either disappeared or recovered.

(Christie, 1987)

The neuropathy of poliomyelitis is usually pathognomonic, only certain cells and areas of the neuraxis are susceptible to the virus. Lesions occur mainly in:

- ① Anterior horn cells of the spinal cord.
- ② Vestibular nuclei, cranial nerve nuclei and the reticular formation which contains the vital centers in the medulla.

- ⊗ Nuclei in the roof and vermis of the cerebellum.
- ⊗ Midbrain, thalamus and hypothalamus, motor area of the cerebral cortex and pallidum.
(Cherry, 1983)

Extraneural pathology is usually a secondary phenomenon. Bronchopulmonary changes may occur e.g. atelectasis and aspiration pneumonia. Cardiovascular changes may result in hypertension and cardiac failure. Prolonged immobilization leads to negative nitrogen and calcium balances with urinary lithiasis, renal failure, hypertension with encephalopathy and convulsions.
(Cherry, 1987)

CLINICAL PICTURE

There is no common cause other than poliomyelitis for asymmetric, scattered flaccid paralysis accompanied by signs of meningeal irritation and fever.

(Silver et al., 1980)

(1) Asymptomatic infection:

Almost all the population have been subjected to asymptomatic, inapparent infection due to the natural exposure of the virus.

(Young, 1981)

(2) Abortive poliomyelitis:

A brief febrile illness (fever seldom exceeds 39.5 °C) with malaise, anorexia, nausea and vomiting.

(Cherry, 1987)

(3) Non - paralytic poliomyelitis:

The most common form of the disease, the symptoms are those enumerated for abortive poliomyelitis except that they are more intense. Nuchal and spinal rigidity is a necessity for the diagnosis of non-paralytic poliomyelitis. There is no clinical or laboratory evidence of invasion of the CNS. Diagnosis can be rarely established except by inference in epidemics.

(Silver et al., 1980)

In the early stage the reflexes are normally active, changes in reflexes, either increase or depression, may precede weakness by 12 - 24 hours, hence it is important to detect them, especially in non-paralytic patients managed at home.

(Cherry, 1987)

(4) Paralytic poliomyelitis: (spinal type)

- a) Paralysis may occur without obvious antecedent illness, especially in infants. It usually begins and progresses during the febrile stage of the illness.
- b) Tremor upon sustained effort may be 1st clue to diagnosis and may be present before weakness occurs.

c) Muscle tightness and pain on stretching may cause malfunction and simulate paralysis.

(Silver, 1977)

On physical examination the distribution of paralysis is characteristically spotty. Flaccid paralysis is the most obvious clinical expression of the neuronal changes. The ensuing muscular atrophy is due to denervation plus the atrophy of disuse. Bladder paralysis of 1 - 3 days duration occurs in 20% of patients, and bowel atony is common.

(Cherry, 1987)

(5) Bulbar poliomyelitis:

Paralytic poliomyelitis which includes involvement of the cranial nerves and brain stem. Significant lower spinal involvement may be absent. Any cranial nerve may be affected, but swallowing difficulties predominate. This form of poliomyelitis is more likely to occur in the patient who has had his tonsils removed. Irritability, disorientation, drowsiness and coarse tremors not explained by inadequate ventilation are noted. It follows a fulminant course.

(Silver et al., 1980)

RESPIRATORY DIFFICULTY IN POLIOMYELITIS :

May occur with the following :

- (A) Paralysis of intercostal muscles: manifested by anxiety, increased respiratory rate, and reluctance to vocalize. Upper arm and shoulder muscles are often

involved. Diagnosis is made by observation in oblique light with examiner splinting the abdomen to exaggerate chest motion. Determination of vital capacity and tidal volume and their relationship to the normal for age and size of patient is very important. Normal standards for tidal volume should be increased 5% for each degree of fever. More indirect clues include frequent inspiration in normal conversation.

- (B) Paralysis of the diaphragm: are easily overlooked and usually associated with intercostal paralysis.
- (C) Damage to medullary respiratory center:
1. Severe form: irregular, shallow, spasmodic breathing.
 2. Mild form: affecting sensitivity of center to low carbon dioxide tension. Patient "forgets" to breathe.
- (D) Obstruction of pharynx or trachea: due to aspiration of saliva secondary to pharyngeal and/or palatal paralysis may simulate any of the above conditions.

(Silver et al., 1980)

The clinical findings resulting from involvement of respiratory muscles are; anxious expression - short jerky "breathless" sentences - increased respiratory rate - movement of the alae nasi and accessory muscles of respiration - inability to cough or sniff with full depth -

paradoxical abdominal movements due to diaphragmatic immobility - relative immobility of the intercostal spaces , which may be segmental, unilateral or bilateral.

When the arms are weak, and especially when deltoid paralysis occurs, it is well to beware of impending respiratory paralysis since the phrenic nerve nuclei are in adjacent areas of the spinal cord.

(Cherry, 1987)

LABORATORY DIAGNOSIS

The cerebrospinal fluid in early poliomyelitis contains an excess of cells, and protein is slightly raised. The cells are usually lymphocytic, but may at first be polymorphonuclears. After the first few days, the cells fall to normal, and the protein continues to rise. It is not preferred to subject the patient to lumbar puncture, as once the patient is already paralysed, the results of cerebrospinal examination won't probably affect the management.

(El Hawary , 1989)

Virus can usually be grown on tissue cultures from pharyngeal swabs or throat-washings in the first week of the acute stage of the illness and from the faeces, it can be recovered for at least 3 weeks or often longer. However, the presence of virus in the throat or faeces of a patient need not mean that the patient's illness is due

to the virus.

(Christie, 1937)

A fourfold or greater rise in serum antibody to the strain isolated is a more convincing evidence, and for this purpose, acute and convalescent samples of serum should be taken. Neutralizing Ig M may be detected against the serotype, sometimes with a rise in titer.

In general, such virological tests are not required for confirmation. The main value of virological investigation is in isolated cases in non-epidemic times.

(Christie, 1937)

DIFFERENTIAL DIAGNOSIS

I. CONDITIONS CAUSING MUSCULAR WEAKNESS:

1. Infectious neuronitis (Guillain - Barré syndrome) is the most common and difficult differential problem. There are few cells but elevated globulin content in the cerebrospinal fluid. Paralysis is symmetrical. Sensory changes and pyramidal tract signs are common but are absent in poliomyelitis.
2. Peripheral neuritis; postinjectional, toxic...etc.
3. Arthropod-borne viral encephalitis.
4. Neoplasms in and around the spinal cord.

II. CONDITIONS CAUSING PSEUDOPARALYSIS: (do not present with nuchal, spinal rigidity or pleocytosis).

1. Unrecognized trauma from contusions, sprains, fractures and epiphyseal separation is a common cause of diagnostic confusion.
 2. Non - specific synovitis produces a limp, usually unilateral, the hip and the knee are the most common sites.
 3. Acute osteomyelitis has a more septic course.
 4. Acute rheumatic fever (clinical pattern is usually diagnostic).
 5. Scurvy (revealed by history of inadequate intake of vit. C).
- (Horstmann, 1981)

COMPLICATIONS

1. Melena severe enough to require transfusion may result from single or multiple superficial erosions, perforation is rare.
 2. Acute gastric dilatation causing further embarrassment of respiration.
 3. Mild hypertension of a few days duration.
 4. Dimness of vision, headache and a light headed feeling.
 5. Acute pulmonary oedema.
 6. Skeletal decalcification begins soon after immobilization and results in hypercalciurea, which in turn predisposes to calculi.
- (Cherry, 1983)

PREVENTION

In the United States and other industrialised countries, poliomyelitis has been virtually eliminated through the widespread use of either inactivated (IPV) or oral poliovaccines. However, endemic and epidemic poliomyelitis is still a problem in many areas of the world. (Nightingale, 1977). In Egypt the disease is endemic with no outbreaks of epidemics.

(Ibrahim, 1984)

Immunization of children will be discussed later in a separate chapter for vaccines.

TREATMENT

The broad principles of management are to allay fear, to minimize skeletal deformities, to anticipate and meet complications in addition to the neuromusculoskeletal ones, and to prepare the child and family for the prolonged treatment which may be required and for permanent disability when this seems likely.

(Cherry, 1983)

(A) SPECIFIC MEASURES :

None are known.

(B) GENERAL MEASURES :

Many cases of poliomyelitis can be cared for in the home. Special facilities and trained professional

personel are required for the severely involved patients.

1. Bed rest: may limit paralytic involvement.

A calm atmosphere is desired. Suitable body alignment is necessary to avoid excessive skeletal deformity.

(Cherry, 1987)

2. Heat: may relax extremely tender and tight muscles so that physiotherapy may be undertaken.

a) Hot packs (sister Kenny treatment)- Wool cloths cut in appropriate size and shape are heated in boiling water, wrung "dry" in a wringer or a spinner, and applied quickly to areas of muscle tightness and tenderness. The cloths should be hot enough to be mildly painful but not hot enough to cause burns, usually 43 - 60 C. They are then covered with oiled or rubberized material, and the patient wrapped in blankets. Applications should be made as often as adequacy of nursing personnel permits, fever is not a contraindication.

b) Hot tub (mild ambulatory cases)- Water at 40.6 - 43.3 C relieves hamstring, calf or back pain.

(Silver et al., 1980)

3. Parasympathetic stimulant: such as bethanechol 5 - 10 mg orally or 2.5 - 5 mg subcutaneously may induce voiding in cases of bladder paralysis, if

it fails manual compression of the bladder and the psychologic effect of running water should be tried. strict asepsis is essential if catheterization is performed. (Horstmann, 1981)

4. Constipation is common, and fecal impaction should be prevented. Diet with a relatively high fluid intake should be started at once unless there is vomiting. Additional salt should be provided if temperature is high. (Cherry, 1987)

5. Physiotherapy: Most important single factor in cure. Passive motion is begun during acute stage to point of pain only. All extremities must be exercised to prevent joint immobilization. Active motion is begun when pain subsides. Uncoordinated or unnatural function must be avoided as long as possible. Postpone resistance type exercises until all tightness has subsided.

6. Orthopedic measures: Patients with back symptoms need a bed-board. Foot or leg involvement requires foot-board if patient is old enough to cooperate. If not, a splint may be needed. Braces and surgery are indicated only after physiotherapy has been attempted. (Silver et al., 1980)

The aim of orthopedic interference:

- a. Stabilization of joints.
- b. Equalization of limbs.
- c. Lengthening of limb.

7. Appliance: part of Medical Rehabilitation.
e.g. splints, crutches and braces.
8. The management of pure bulbar poliomyelitis consists essentially in maintaining the airway and avoiding all risks of inhalation of saliva, food or vomitus. Gravity drainage of accumulated secretions is favoured by the head low (foot of bed elevated 20 - 25 degrees) prone position with face to one side. Fluid and electrolyte equilibrium is best maintained by intravenous infusion since tube or oral feeding in the first few days may incite vomiting. (Nelson, 1987)

(C) TREATMENT OF RESPIRATORY DIFFICULTIES:

1. Intercostal or diaphragm paralysis. Artificial respiration before cyanosis appears.
 - A) Tank type respirator -Experienced personnel needed:
 - (1) Rate 16 - 18 per minute.
 - (2) 10 - 15 cm (-ve) pressure for children.
 - (3) 2 cms positive pressure. Increase to 8cms with shock.
 - (4) Removal of patient from tank depends upon degree of impairment and recovery rate.
If vital capacity is below 10% of normal, removal will require many months. Above 10% of normal, progressive removal may be

started with return of temperature to normal. Length of time out is determined by signs of fatigue, increased pulse rate, anxiety and cyanosis.

B) Chest respirator (cuirass)- About 60% as efficient as tank. It is useful in rehabilitation and simplifies the problem of nursing care.

2. Severe respiratory center involvement - If intercostal muscles are not paralysed, results with tank respirator are very poor due to incoordinate muscle action. Electrophrenic stimulation is very useful. (Silver et al., 1980)

3. Tracheostomy - Paralysis of muscles of swallowing and need for tank respirator usually requires tracheostomy for efficient removal of aspirated material. In bulbar cases, observe for respiratory difficulty; tracheostomy is best done before putting patient in tank. In younger children and infants for whom inability to swallow will mean more chance of massive aspiration, tracheostomy may be done without the customary indication of need for artificial respiration.

(Cherry. 1987)

PROGNOSIS

Prognosis as to paralysis is guarded until pain subsides. In the bulbar form, prognosis is good if complications are overcome. Polioencephalitis usually has a poor prognosis for survival. If the respiratory center is severely involved, prognosis is very poor.

(Silver et al., 1980)

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P O L I O V A C C I N E S

The incidence of the disease has been sharply reduced since the introduction of effective vaccine. In less than a decade, poliomyelitis has become a rare disease in developed areas of the world.

Three antigenically distinct types of poliomyelitis virus (I, II, III) are recognized, with no cross immunity between them.

Poliovaccines afford a high degree of protection to individuals adequately immunized against all 3 types. Both inactivated (Killed, Salk) and attenuated (oral, live, Sabin) vaccines produce satisfactory immunity.

VACCINES AVAILABLE:

(1) Inactivated poliovaccine: (Salk vaccine)

This is formaldehyde inactivated virus containing all 3 types (I, II, III). The viruses are grown on monkey kidney tissue culture containing minute amount of penicillin. Neomycin is added during manufacture to ensure sterility. The vaccine does not contain alum or any other adjuvant. The vaccine is supplied in 9 mls.vials. The usual dose is 1 ml. I.M. At this time IPV is not readily available. One Canadian firm manufactures IPV and has an outlet in the USA, but su-

plies have been limited.

(2) Monovalent attenuated poliovirus vaccine:

This vaccine is supplied as the live attenuated virus, which is grown on monkey kidney tissue culture. The vaccines are monospecific, i.e. they will confer protection only against the type administered. They must be stored at less than 0°C for maximum stability. If stored at ordinary refrigerator temperatures (04°C), the vaccine must be used within 30 days. Once the vial is opened, the period of use is reduced to 7 days.

(3) Trivalent attenuated poliovirus vaccine: (Sabin)

This preparation is similar to the monovalent preparation except that it contains all 3 types of poliovirus in a single dose. Each dose contains more type I and III poliovirus than type II in order to prevent inhibition of the others by type II. Storage and dosage considerations are similar to those outlined above for the monovalent vaccine. A new preparation of trivalent poliovirus vaccine grown in human fetal tissue (W.I. 38) was licensed in 1972 and is equivalent in characteristics to the monkey tissue preparation.

(Shirkey, 1978)

Both vaccines, administered by Injection (Salk) or Orally (Sabin), provoke antibodies against the three poli-

oviruses : the extent to which they do so depends on the dose and potency of the vaccine, and the age of the vaccinee. (Hovi et al., 1986)

Live - attenuated poliovirus vaccine given by mouth stimulates intestinal immunity probably by the production of intestinal secretory Ig A antibodies which seem not to be produced by killed vaccine. (Christie, 1987)

This is of considerable epidemiological importance, for if local intestinal immunity develops, wild virus, can not establish itself in the vaccinee's intestine and cannot readily circulate in the vaccinated community.

(Böttiger, 1981)

The major disadvantage of OPV is the potential risk of neurologic complications in vaccine recipient and susceptible contacts. (Gaebler et al., 1986)

This danger, while must be kept in mind, is small, and hundreds of millions of doses have been given without its incidence. (Christie, 1987)

Recombinant DNA technology may remove the danger of vaccine - associated poliomyelitis. Deletion mutants of polioviruses can be prepared : these are infectious, induce immunity but do not cause disease. Deletion mutants do not revert, so that there should be no danger, as there has been with present vaccine strains.

(Horstmann, 1982)

ANTIBODY PREPARATIONS:

Although much human gamma globulin is labelled polioimmune globulin, its use in the prevention of this disease is antiquated. Such labelling simply implies standardization of the preparation for its polio antibody content. It is true that polio can be prevented by the prophylactic use of gamma globulin, but there are no indications for its use for this purpose in modern medical practice. (Henry, 1978)

IMMUNITY TO POLIOVIRUS

Immunological mechanism as well as non-specific interference phenomena, have been shown to determine the course of a clinical infection. The major factors which have been shown to influence the outcome of a virus infection are circulating antibodies, secretory antibodies, cell-mediated immune responses and interferon.

(Ogra & Karzon, 1970)

① Systemic Immune Response:

Following virus infection or immunization, the serum IgM, IgG and IgA participate in the immune response in a sequential manner.

② Secretory Immune Response:

Antibody against poliovirus types I, II, and III

have been detected in nasopharyngeal, duodenal and rectal washings after infection or immunization with live attenuated virus. This antibody activity is predominantly associated with the secretory IgA. It is known that resistance to reinfection with poliovirus is not accurately predicted by the level of circulating poliovirus antibody.

(Ogra & Karzon, 1970)

In a study made by El Hawary (1989), faecal secretory IgA concentration was quantitatively determined using the single radial immunodiffusion method, in 28 cases of acute paralytic poliomyelitis versus 22 normal controls who received 3 doses of TOPV. It was found that there was a significant decrease in faecal secretory IgA mean concentration in the group of cases compared to the group of controls.

This decrease was explained as being part of an immune deficiency status, whether congenital or acquired. Another assumption was that faecal secretory IgA has been consumed in viral neutralization.

ROUTINE IMMUNIZATION OF INFANTS:

Routine immunization of infants is according to the schedule shown in this table:

6	wk	-----	BCG	
2	mo	-----	DPT	TOPV
4	mo	-----	DPT	TOPV
6	mo	-----	ATP	TOPV
9	mo	-----	Measles.	
1½	yr	-----	ATP	TOPV
4 : 6	yrs	-----	DPT	TOPV
14:16	yrs	-----	TD	and thereafter every 10 years.

(American Academy of Paediatrics, 1977)

Although all 3 types of polioviruses are contained in trivalent OPV, very few individuals may be infected with only 1 or 2 types at each feeding because of interference between the 3 types of polioviruses. Therefore, at least 3 feedings of trivalent vaccine are recommended, in order to be sure of infection by each of the three types. Each dose should be administered at 4 - 6 weeks interval to avoid interference with one type by another from a previous feeding. A fourth dose is usually recommended, in case an Echo or Coxsackie virus has interfered with infection during a previous feeding.

(Feldman et al., 1964)

A booster TOPV may also be given at the time the child enters school. The trivalent OPV is preferable to

the monovalent OPV because of difficulty in remembering or in keeping records of the types previously received. Breast feeding after the first week of life does not interfere with the infection with the vaccine virus, although transplacentally acquired serum antibodies may interfere to some degree. Breast feeding need not be withheld before or after administration of the vaccine.

(Deforest et al., 1973)

Lapsed immunization, if TOPV schedules are interrupted for any reason, the doses should be administered as if no interruption occurred. The suggested intervals are the minimum criteria to ensure routine immunization. Longer intervals do not affect the immunizing potential of TOPV.

(Mortimer, 1987)

EFFICACY:

TOPV is very effective in producing infection as demonstrated by development of antibodies. Typical results of studies of triple negative individual (no detectable antibody to any of the 3 poliovirus types) show that 2 feedings of TOPV a month apart produce persistent antibodies to type I in about 85 - 90 %, to type II in about 100 % and to type III in about 98 %.

(Cabasso et al., 1964)

As shown in that study, individuals are less likely immunized against type I than to the other 2 types, and

some authorities have suggested feeding type I vaccine, followed by a combination of type II and III. If an individual lacks antibodies to one type, feeding the trivalent vaccine results in infection with that type, and fills the immunologic gap. (Lepow & Spence, 1965)

Antibodies have been observed to persist for 8 years in about 80 - 90 % of children for types I and III and in about 99 % of children for type II.

(Rousseau et al., 1973)

The ultimate test of immunity is lack of infection after exposure to disease. Poliovaccine is clearly effective in so far as this can be observed. In the United States, paralytic poliomyelitis in an individual previously immunized with 3 doses of live poliovaccine has almost never been observed.

CONTRAINDICATIONS:

Patient with serious defects in cell-mediated immunity or in those receiving immunosuppressive therapy. Administration of live vaccine to pregnant women should be avoided, although there is documented risk to the fetus from poliovaccine. If the woman plans to travel to an area where poliomyelitis is prevalent, the vaccine should be given.

(Levin, 1974)

COMPLICATIONS OF POLIOVACCINE:

During the past 20 years live oral poliomyelitis vaccines have proven to be effective and safe. Paralytic poliomyelitis has almost completely vanished from countries which have subscribed to vaccination program reaching the majority of susceptible young children.

(Grist, 1983)

Minor gastro-intestinal, minor upper respiratory symptoms, or fever were reported in about 1 - 5 % of children receiving monovalent poliovaccine, but were interpreted as being unrelated to the vaccine.

(Pagano et al.,1960)

Paralytic illness occurring within 30 days of vaccine in a recipient, or within 60 days in a contact has been defined as a vaccine - associated case of paralytic poliomyelitis in vaccine recipient have been decreasing in frequency, with 57 cases before 1964, 15 cases between 1964 and 1968 and non in 1969.

(National communicable disease center, 1970)

Gaebler et al.(1986), in a recent report described three previously healthy infants with the onset of flaccid paralysis after administration of live attenuated poliovirus vaccine, these three infants fulfilled clinical and epidemiologic criteria for an illness compatible with poliomyelitis.

The live attenuated vaccine should not be given to persons who are immunocompromised or have contacts that are unimmunocompromised. It is relatively safe in all others and should be given routinely.

(Moore, 1982)

Potential risks of oral poliomyelitis vaccine are believed by some to exist in adults, especially above the age of 30. (Henderson et al., 1964). It is therefore suggested that injectable vaccine be administered to non-immunized parents of infants, that are vaccinated with the live oral poliovaccine. A similar opinion has been expressed by the WHO consultative group in 1982.

-----oooooooooooooooo-----



Fig. (2) : An Egyptian stele from the Eighteenth Dynasty.
(Ibrahim, 1975).

P O L I O M Y E L I T I S

I N E G Y P T

Poliomyelitis seems to have been endemic in Egypt since ancient times. Archaeological evidence of sporadic cases was shown on stone carving of an ancient Egyptian showing a deformity so characteristic of the after-effect of poliomyelitis. This picture which was dating back to the eighteenth dynasty (1580 - 1350 B.C.) showed a crippled young man apparently a priest, with a withered short leg, the foot was held in the typical equinus deformity characteristic of flaccid paralysis. (Fig 2)

(Ibrahim, 1975)

The apparent rarity of the disease in the first half of the twentieth century in Egypt was mostly due to under reporting of cases in the acute stage and the relatively high infant mortality rate.

(Ibrahim, 1984)

During World War II epidemics of poliomyelitis were recorded among British and other foreign troops of soldiers who entered Egypt as susceptible immigrants, but not among Egyptians, hospital records from Cairo showed a very few sporadic fatal cases of poliomyelitis.

(Paul et al., 1944)

This drew the attention to study the disease in Egypt. There was a progressive number of reported cases,

but no epidemics occurred among natives mostly because infants and children have the opportunity of coming in contact with all three types of poliovirus early in their life. Accordingly, they either had the disease or acquired silent immunity at an early age. This resulted in a high immune population in which the youngest infants and children were the most susceptible.

(Ibrahim, 1984)

There were no records about the incidence of the disease in Egypt, until Abd-El-Khalik et al.,(1954) studied the incidence of poliomyelitis in Egypt depending on data obtained from El Mounira Paediatric Hospital, Cairo University. The studied cases were those attending the physiotherapy department during 15 years (1939-1953). They found that in 1939, only 38 cases of polio were referred where as in 1953, 889 cases were received representing a 23 fold increase.

They found that the majority of cases were under 4 years of age with maximum incidence between 11 and 13 months of life and they encountered only 2 cases during the neonatal period. Males were affected more than females in the ratio 3 : 2. They reported that the spinal form of poliomyelitis was the commonest paralytic type in Egypt and that the bulbar cases accounted for less than 1 %. It is considered that the number of paralytic cases goes hand in hand with the number of non-paralytic

Table (1) : Number of cases received at the
 physiotherapy department of the
 Children's Hospital, Mounira, Cairo from
 1938 ---- 1953

Year	<u>No</u> of cases	Year	<u>No</u> of cases
1938	38	1946	246
1939	90	1947	911
1940	65	1948	234
1941	89	1949	322
1942	71	1950	413
1943	98	1951	806
1944	119	1952	880
1945	181	1953	889

(Abd -El- Khalik et al., 1954)

cases. On the assumption that equal number were referred to private clinics and administrative hospitals, they arrived at the conclusion that at least 1800 cases were treated in Egypt in (1953), with a case rate of 9 per 100,000. Table 1.

Dewani et al.(1963) studied poliomyelitis paralytic cases attending the same hospital in the years 1957-1959. There was about four folds increase than in 1953 with significant rise in cases during the summer months and confirmed male preponderance. They conclude that the increase was not only an apparent one due to the increased awareness of the population i.e. there must be an actual increase. Since then the disease attracted the attention as a major public health problem and invited the introduction of the vaccine in (1961) but it was given sporadically. It became compulsory by (1965) to all infants born all over the country.

This was accompanied by a drop in the number of cases in the first 3 years (1965 - 1967), according to data obtained from I.P.R. After that the picture began to change with a steady rise in the number of cases especially in the years (1971 - 1973). Table(2) Graph(1).

Imam and Labib (1975) after reviewing studies on poliomyelitis in Egypt in the previous 15 years concluded that:-

- ⑥ There was a steady rise in the number of reported cases of paralytic poliomyelitis even after the application of compulsory vaccination since 1965. They accounted for that by previous under-reporting of the disease besides difficulties in providing adequate vaccine coverage for all infants at risk.
- ⑥ The disease appeared all over the year with a peak in summer.
- ⑥ Epidemiological data and serological surveys emphasized that the disease was of infants and young children.
- ⑥ The three types of poliovirus (I,II,and III) were present in Egypt. The prevalent type shifted from type to another by passage of time,i.e. the poliovirus type distribution was not always static.
- ⑥ Oral poliovaccine studies indicated that the vaccine when used in the proper way and dosage was of high immunological efficiency.
- ⑥ The need for proper mass vaccination in a short time was imperative.

The real magnitude of the problem reached a point that urged the review of our vaccination system and the decision of administrating the vaccine in mass campaign in a period of few days, and repeating it again at appropriate intervals. Annual oral poliovaccine was given for all children from 3 months to 3 years. Vaccination

is introduced regardless of the number of OPV doses they may have had before. The annual incidence of cases of acute poliomyelitis showed significant reduction after conduction of mass nation - wide campaigns. Complete elimination of the disease has not yet been achieved.

(Ibrahim, 1985)

In Egypt, climatic and in some areas, hygeinic conditions permit extensive dissemination of naturally occurring poliovirus and other enteroviruses especially in summer months. This complicates proper vaccination and may be the cause of occurrence of the disease in the supposed to be vaccinated children. The phenomenon of viral interference is taken in account in planning the use of live poliovaccine in mass campaigns. It is planned to conduct the campaigns during winter months.

(Ibrahim, 1985)

Sabin (1985), mentioned that the simultaneous feeding of the vaccine strain to the largest possible number of children in the shortest time, gives rise to more extensive natural dissemination of excreted poliovaccine virus. The vaccine strains have the opportunity to rapidly displace the largest number of naturally occurring poliovirus. Massive dissemination of the vaccine strains excreted by vaccinated children serve to infect children who, for one reason or another, are missed during the program or who may have had interfering non-polio

enteric infection.

There is a possibility that mass campaigns have weakened the routine immunization. Routine proper immunization should go side by side with mass campaigns.

(Ibrahim, 1985)

Egypt reported that 72 % of infants have been fully immunized by the age of 12 months (WHO,1982). However, a questionnaire was made to the mothers about the doses of vaccine previously received by their affected infants in a trial to find the reason for this high incidence of the disease in Egypt. It was found that 32% of cases were not vaccinated at all, 48% of cases were partially vaccinated by one or two doses while the rest 20% received the three doses(El Saied , 1985). The majority of cases came from the low socioeconomic class of the society that had low sanitary hygeinic standard.

Since the introduction of compulsory immunization against poliomyelitis in the mid 1960's, Egypt has had a preponderance of cases associated with poliovirus type II Lansing strain. Contrary to what would have been expected a marked preponderance of cases associated with poliovirus type I was noted in 1977, 1978 and 1981. Adisproportionately high rate of type II-associated cases again was observed in 1979 and 1980.

(Assaad and Ljungars,1984)

The Egyptian Ministry of Health supplemented the routine immunization by mass campaigns starting at the end of 1976. The first campaign was successful. Cases received by the IPR dropped from 1567 in 1976 to 790 in 1977 i.e. 53 % reduction. (Annual Report, 1977). However in 1978 there was a trend towards an increase in incidence. A second mass campaign was organised late in 1978, still the number of cases increased. This was followed by several M.V.C. during the last decade accompanied by publicity campaigns through the different mass media channels. The number of cases started to drop by the mid 1980's. Table 2, Graph 1 .

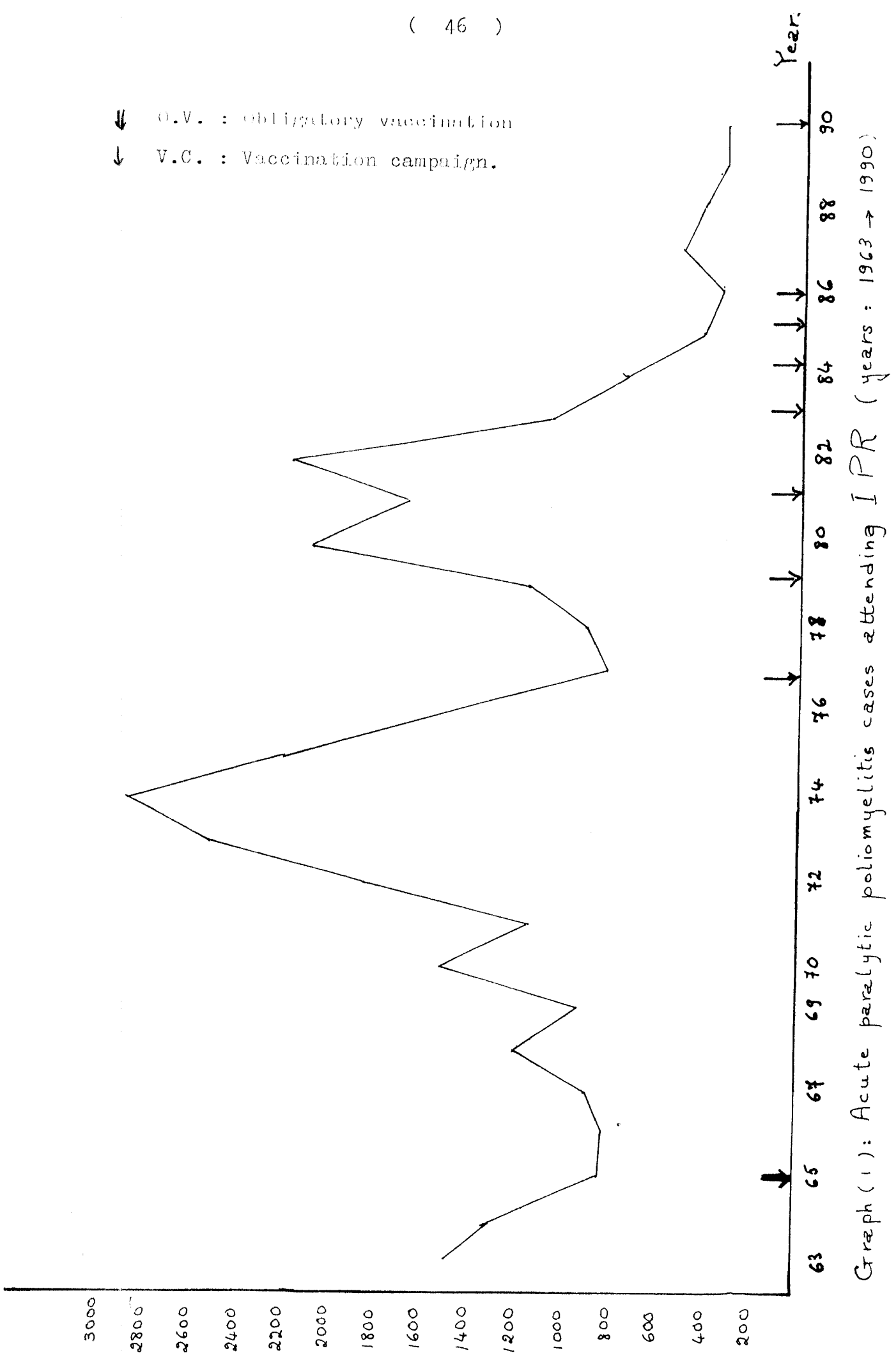
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Table (2): Acute Paralytic Poliomyelitis Cases Attending
IPR - Embaba from the years 1963 ---1990.

Year	No of cases	Year	No of cases
1963	1479	1977	0790
1964	1262	1978	0934
1965	0815	1979	1123
1966	0805	1980	2006
1967	0840	1981	1613
1968	1157	1982	2113
1969	0888	1983	1022
1970	1484	1984	0699
1971	1124	1985	0416
1972	1813	1986	0339
1973	2539	1987	0492
1974	2831	1988	0416
1975	2157	1989	0384
1976	1567	1990	0383

(IPR statistics department)

- ⇓ O.V. : obligatory vaccination
- ↓ V.C. : Vaccination campaign.



Graph (1): Acute paralytic poliomyelitis cases attending IPR (years: 1963 → 1990)

P O L I O M Y E L I T I S
I N E G Y P T
DURING THE LAST DECADE

For the study and follow up of the epidemiological situation of poliomyelitis in Egypt, we obtained our data from the statistics department at the I.P.R. (Institute of Polio and Rehabilitation, Embaba). Our index to the progress of the disease was the acute paralytic cases attending the IPR for the first time.

1 9 8 0

There was a gradual rise in the number of cases recorded by IPR since 1977 till it reached 2006 cases in 1980. A questionnaire was made in IPR about the number of doses of the vaccine previously received by their affected infants, both in the MVC and in the GV.

As regards MVC, almost all affected infants were unvaccinated. taking in consideration the age of patients and the period which lapsed since the previous MVC (end of 1978), most of the affected infants were either too young or not even born yet.

As regards GV, 45.5 % were not vaccinated, 18.4 % received the 3 doses and the rest partial doses (1 or 2)

So, a big percentage of infants escaped CV, and some of those who were either completely or partially vaccinated caught the disease due to either factors affecting their immunological response, or factors related to handling and storage of the vaccine. Tab. 3, Gr. 2.

② Geographical Distribution :

Cases attending the IPR were distributed as shown in table 4, graph 3 as follows: 34.4 % from Giza, 25 % from Cairo, 19.7 % from Kalubia, 16.4 % from lower Egypt (with a high incidence of cases from Minofia) and 4.5 % from Upper Egypt, i.e. 79 % of the total number of cases were from Giza, Cairo and Kalubia Governorates.

The number of cases for Giza and Kalubia nearly represent the number of cases in these two Governorates, while that for Cairo is only partial as the rest of cases are treated in University and other hospitals.

The number of cases for Lower Egypt is more than that for Upper Egypt, as the former is nearer to the IPR. Most cases in Lower and Upper Egypt are treated locally in special sections in University or other governmental hospitals.

③ Age Incidence :

The disease was completely infantile as shown in table 5 and graph 4, 96 % of cases lie between the age of 6 months and 2 years. The maximum age reported was

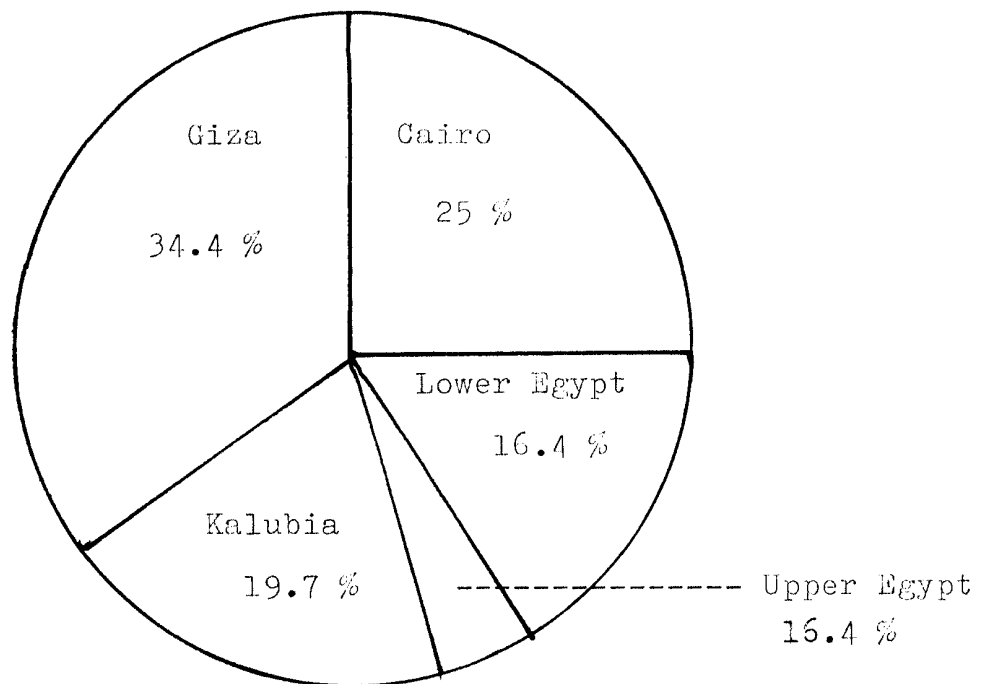
4 years and the minimum was 3 months.

⊙ Sex Incidence :

Males were more susceptible to the disease in the ratio 3 : 2. Table 6, Graph 6.

⊙ Seasonal Incidence :

The disease was present all the year round with a higher incidence in the Summer and Autumn months. Table 6, Graph 5.

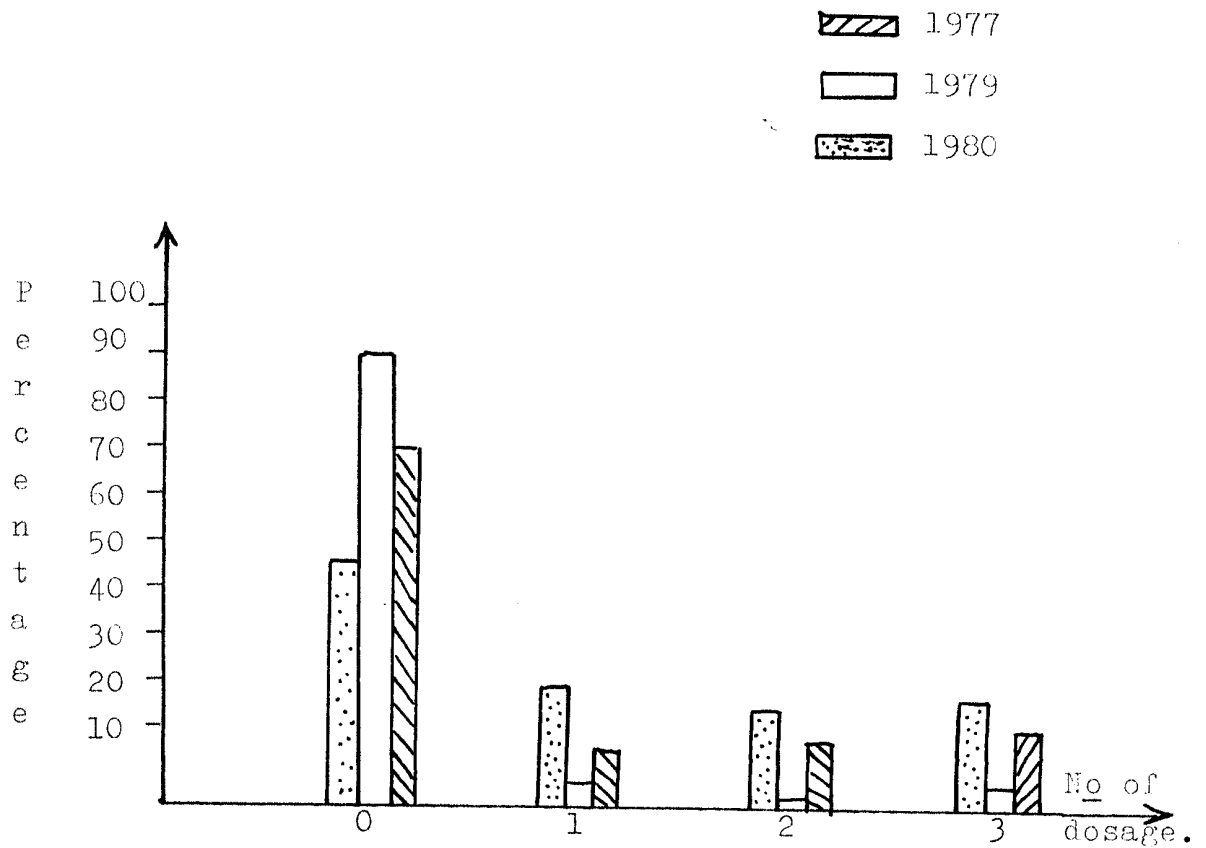


Graph (3): Geographical distribution of acute cases in 1980.

Previous Vaccination of Acute Folio Cases during
1 9 8 0

	0	1	2	3	Total.
Number	912	386	339	369	2006
percentage	45.5	19.2	16.9	18.4	100

Table (3)



Percentage of doses of vaccine received by acute cases in MVC for the years 1977, 1979 and 1980.

Graph (2)

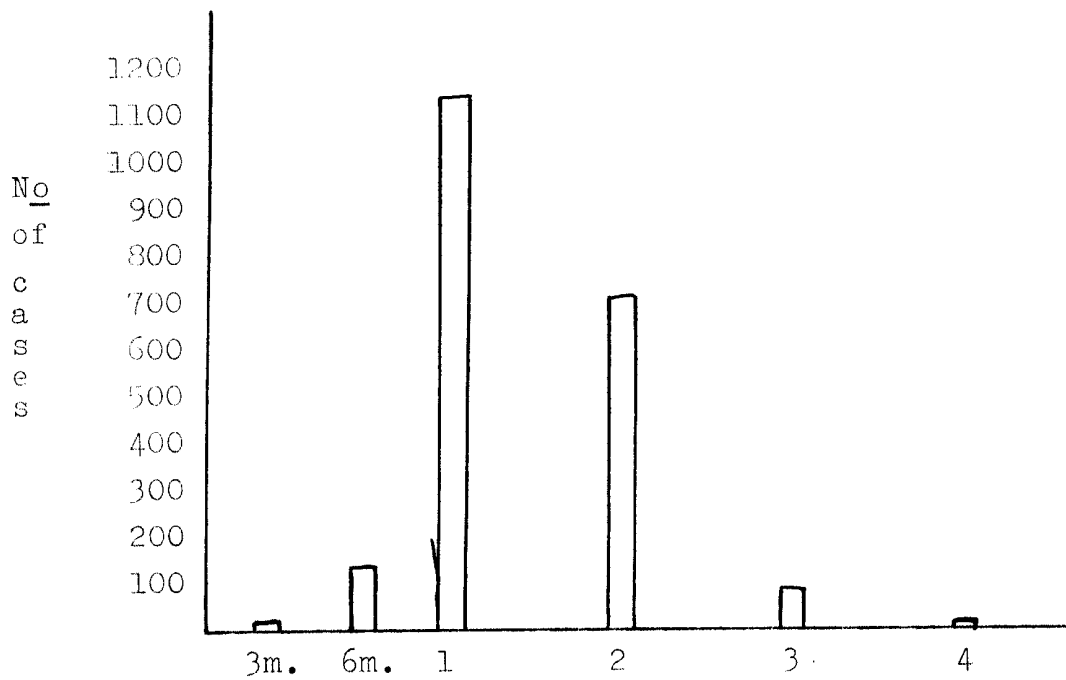
Table (4): The Geographical distribution of acute cases attending the institute for the year 1980.

Governorate	No of cases.
Giza	689
Cairo	504
Kalubia	396
TOTAL	1589
<u>Lower Egypt:</u>	
Menoufia	163
Gharbia	40
Kafr-El-Sheik	4
Sharkiah	64
Dakahlia	24
Behaia	25
Damietta	3
Ismailia	3
Suez	3
Total	329
<u>Upper Egypt</u>	
Beni Suef	9
Menya	15
Fayoum	34
Assiut	2
Suhag	7
Kena	15
Asswan	4
New Valley	1
Total	88
Total No for Egypt.	2006

Age Incidence of Acute Cases (1980).

Age	No of acute cases
3 months	11
6 months	156
1 year	1096
2 years	674
3 years	62
4 years	7
Total	2006

Table (5)



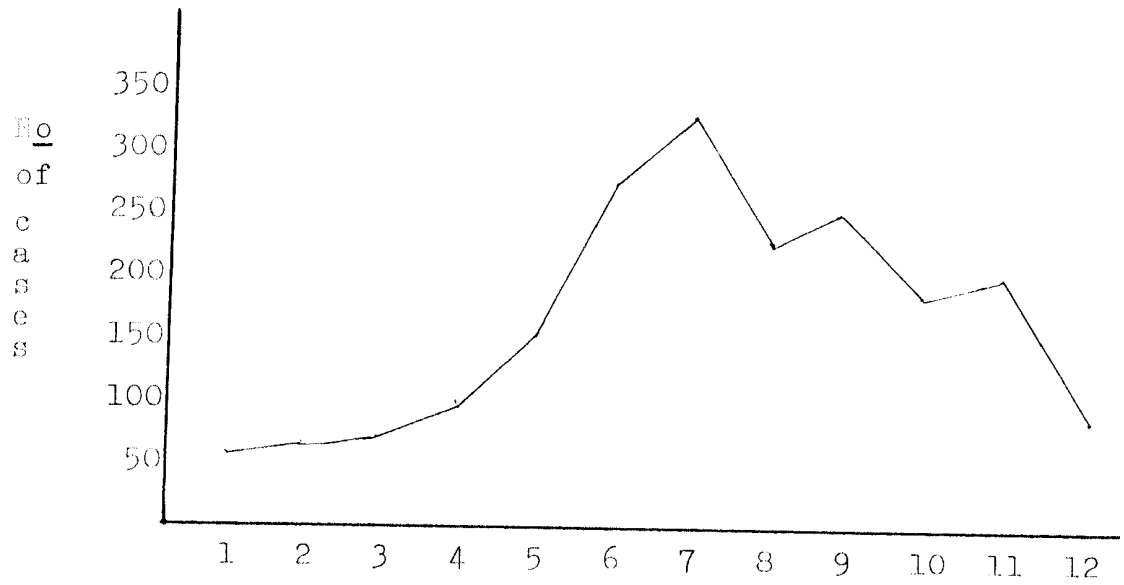
Age incidence of acute cases (1980)

Graph (4)

Monthly Distribution of acute cases according
to sex in 1980.

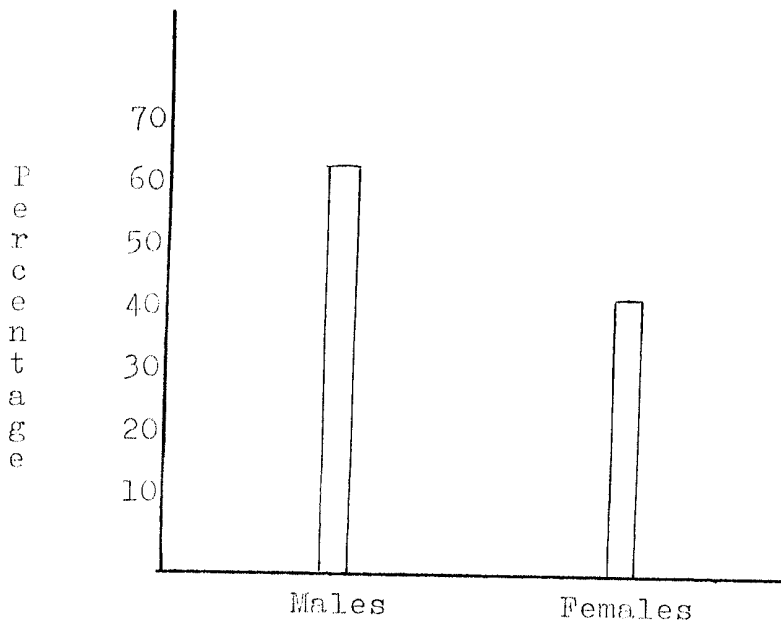
Months	Males	Females	Total
January	36	24	60
February	33	31	64
March	40	29	69
April	63	34	97
May	101	61	162
June	171	105	276
July	206	121	327
August	128	98	226
September	165	78	243
October	110	71	181
November	112	85	197
December	60	44	104
Total	1225	781	2006
Percentage	61 %	39 %	100 %

Table (6)



Seasonal Incidence of acute cases(1980)

Graph (5)



Percentage of males and females in acute cases (1980)

Graph (6)

1 9 8 1

The third MVC was performed in the first quarter of 1981 to meet the increased number of cases in 1980 (2006). But the number of cases was not reduced significantly and reached 1613 in 1981. A questionnaire was done to the mothers in the IPR, which showed that the OV during the first year of life was nearly nil, and the infants received variable doses of the vaccine during MVC or were even not vaccinated at all. Tab.(7) Gr. (7)

Knowing the efficiency of the vaccine in protection against the disease, it was concluded that there were some defects in giving the vaccine to the infants, most probably the vaccine was not swallowed or the infant had some interfering disease e.g. gastroenteritis.

① Geographical Distribution: Tab.(8), Gr. (8).

39.8% of cases came from Giza, 18.9% from Kalubia, 24.7% from Cairo, 11.9% from Lower Egypt and 4.7% from Upper Egypt.

② Age Incidence : Tab.(9), Gr. (9).

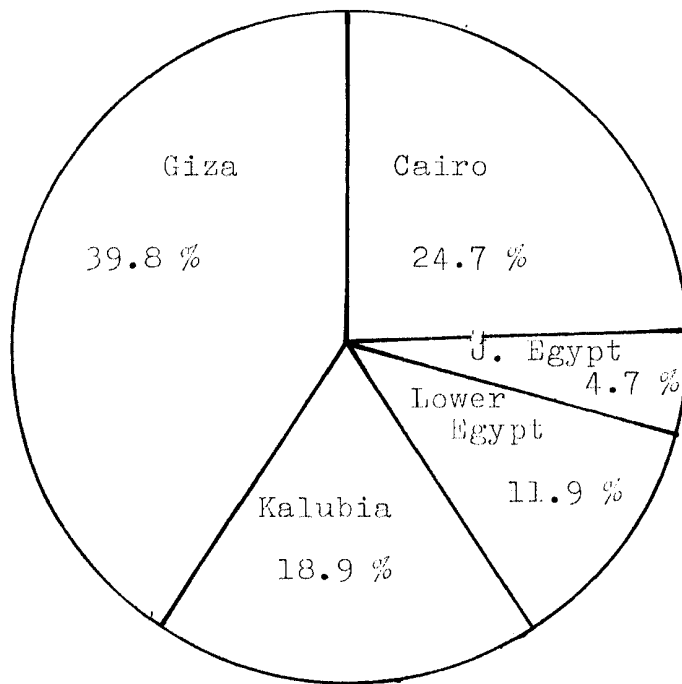
41.9% of cases were below 1 year of age, 40.8 % between 1 and 2 years of age and 17.1 % from 2 - 4 years.

③ Sex Incidence: Tab. (10), Gr. (11).

Males were still more susceptible than females in the ratio of 3 : 2.

@ Seasonal Incidence: Tab. (10), Gr. (10).

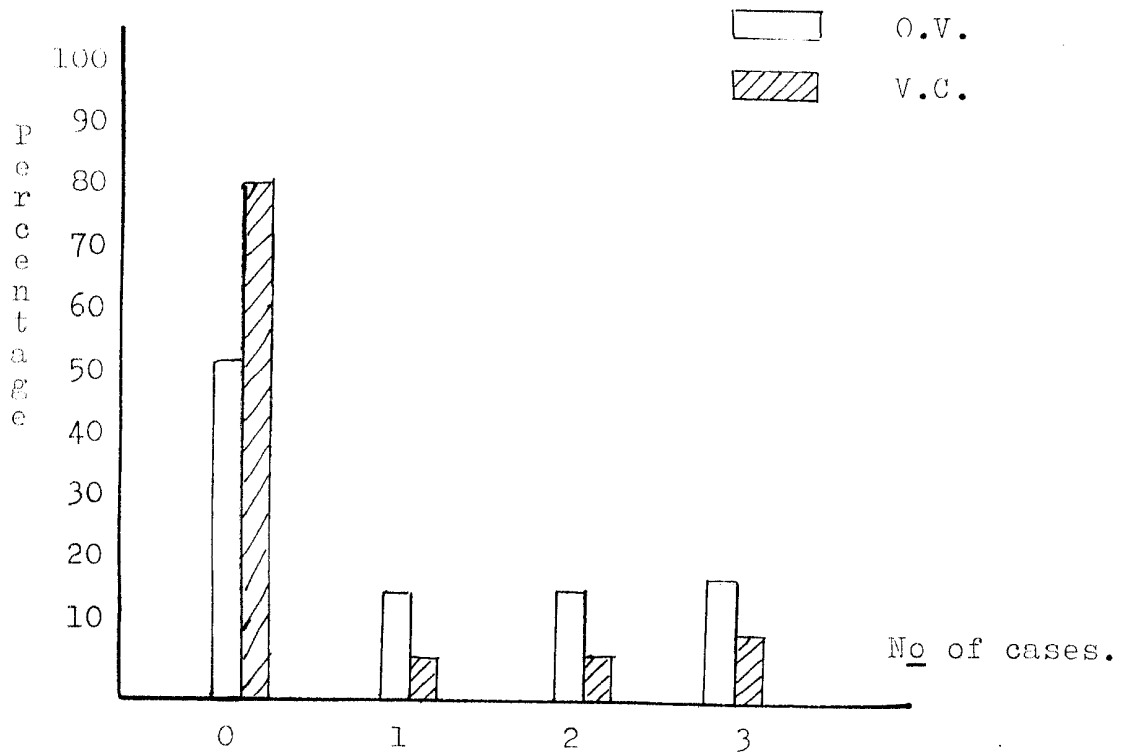
The disease was present all over the year with a sudden sharp rise in June reaching the peak in September and then descending till December.



Graph (8) : Geographical distribution of acute cases (1981).

Table (7): No. of doses of poliovaccine received by acute polio cases attending IPR in (1981).

	D O S E S							
	Regular vaccination				Mass Vaccination			
	0	1	2	3	0	1	2	3
<u>No</u> of cases	843	244	248	270	1290	92	91	132
Percentage	52.5	15.2	15.5	16.8	80.3	5.73	5.7	8.2



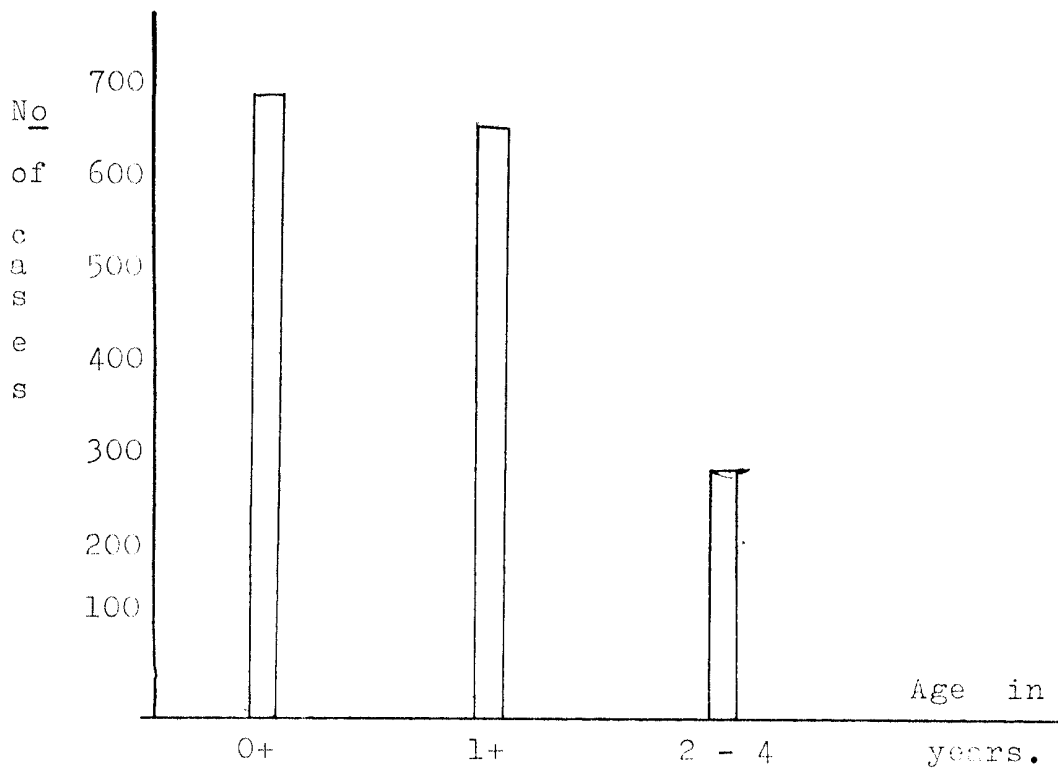
Graph (7): No. of doses of poliovaccine received by acute cases attending IPR in (1981).

Table (8) : Geographical Distribution of acute polio cases attending IPR in (1981).

Governorate	No of cases.
Giza	397
Cairo	639
Kalubia	308
Total	1344
<u>Lower Egypt</u>	
Menoufia	115
Dakahlia	15
Behaira	15
Sharkia	28
Gharbia	10
Kafr-El-Sheik	3
Damietta	3
Alexandria	1
Suez	2
Ismailia	1
Binai	
Port - Said	
Total	193
<u>Upper Egypt</u>	
Beni - Suef	19
Menia	15
Fayoum	25
Assiut	3
Suhag	10
Kena	3
Aswan	
New - Valley	1
Total	76
Total for Egypt	1613

Table (9): Age Incidence of acute cases (1981).

Age in years	0+	1+	2-4	Total
No of cases	677	658	278	1613
Percentage	42 %	40.9%	17.1%	100%



Graph (9): Age Incidence of acute cases (1981).

Table (10) : Seasonal & Sex Incidence of acute
Polio Cases attending I.P.R.
in (1981)

	Males	Females	Total
January	47	24	71
February	27	20	47
March	29	15	44
April	39	16	55
May	48	33	81
June	49	28	77
July	108	56	164
August	161	85	246
September	184	131	315
October	149	98	247
November	89	82	171
December	45	50	95
Total	975	638	1613
Percentage	60.5 %	39.5 %	100 %

1 9 8 2

The number of acute paralytic cases attending the IPR rose again reaching 2113 cases while the previous year was 1613 cases.

④ Geographical Distribution:

Some localities in Embaba, Giza, in Kalubia and in Ashmoun, Menoufia were known to have the highest incidence of the disease in Egypt. Children below 4 years of age in such localities received 4 doses of live attenuated poliovirus vaccine. The first dose was in July 1982, using the polyvalent vaccine, the second dose was in September 1982, using the poliovirus type II vaccine and the third dose was in November 1982, using the poliovirus type I vaccine, the fourth dose was in January 1983, using the polyvalent poliovirus vaccine. The number of paralytic cases in those localities dropped to 113, 132 and 136 in September, October and November 1982 respectively, compared to 315, 247 and 171 for the same months during the year 1981. (Annual Report, 1982) (Table 11, Graph 12) show the highest incidence from Giza (37.4 %), Cairo (22.8 %), Kalubia (20.1 %), Menoufia (9.5 %), Lower Egypt (15.2 %) and Upper Egypt (4.4 %).

④ Age Incidence: Tab. (12), Gr. (13).

The age of 1 - 2 years was representing the highest level (47 %) followed by the age below one year (37 %)

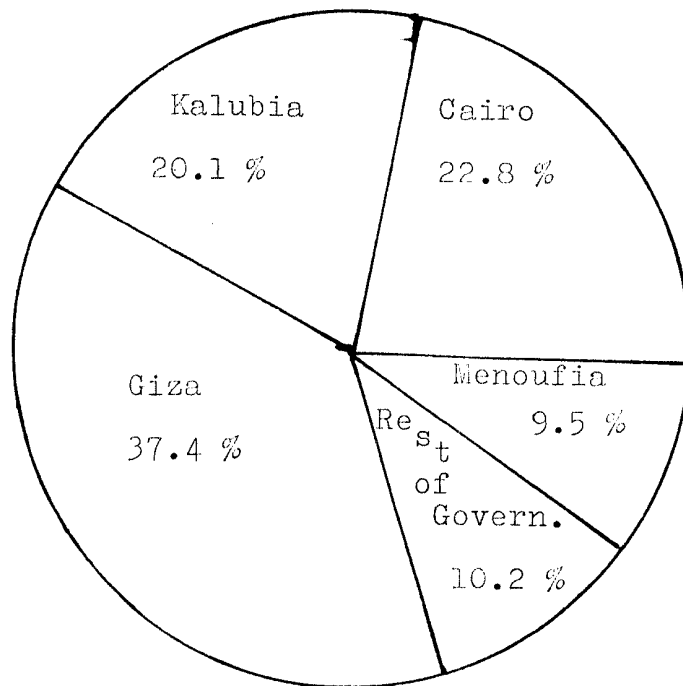
⊙ Sex Incidence: Tab (13), Gr. (14).

Males 62 % and females 38 % showing male preponderance.

⊙ Seasonal Incidence: Tab. (14), Gr. (15).

Cases started to increase in April and the peak was reached in June and July. The number of cases from the first of January 1982 through the end of August (1982) was 1609 (76 % of the total number of cases), compared to 785 cases for the same period during the year 1981 (49 % of the total number of cases for that year)

(Annual Report, 1982)

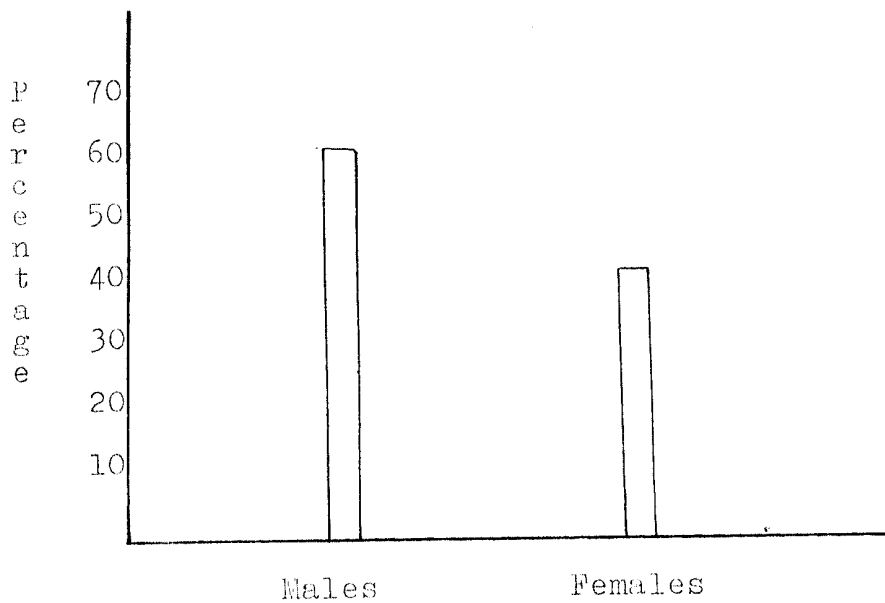
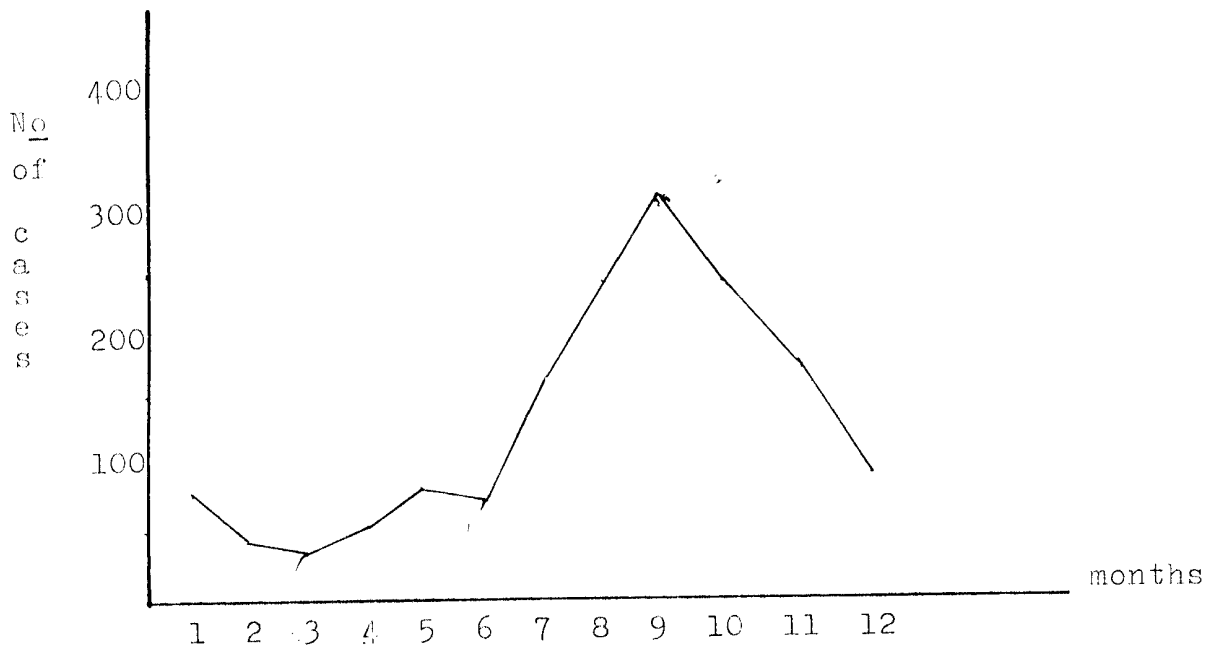


Graph (12): Geographical distribution of acute cases (1982).

Table (11): Geographical Distribution Of Acute Polio Cases attending I.P.R. in (1982).

Governorate	No of cases
Cairo	480
Giza	779
Kalubia	426
Total	1685
<u>Lower Egypt</u>	
Meoufia	199
Gharbia	16
Kafir-El-Sheikh	8
Shakia	36
Dakahlia	17
Behaira	30
Damietta	8
Ismailia	5
Port- Said	1
Suez	9
Total	329
<u>Upper Egypt</u>	
Beni- Suef	25
Menia	15
Fayoum	29
Assiut	3
Suhag	17
Kena	5
Asswan	2
Total	96
Total for Egypt	2113

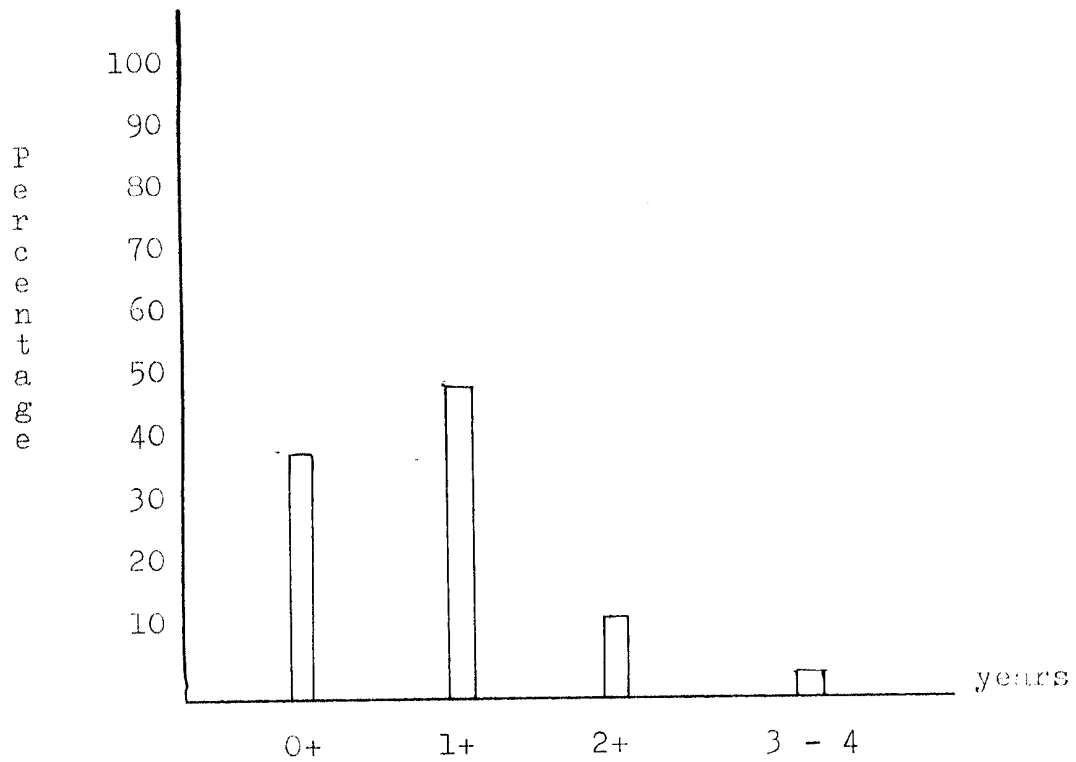
Graph (10): SEASONAL INCIDENCE OF ACUTE CASES (1981)



Graph (11): Percentage of Males and Females in acute cases (1981).

Table (12): Age Incidence of acute cases (1982)

Age in years	0+	1+	2+	3-4	Total
Cases	778	992	258	85	2113
Percentage	37 %	47 %	12 %	4 %	100 %

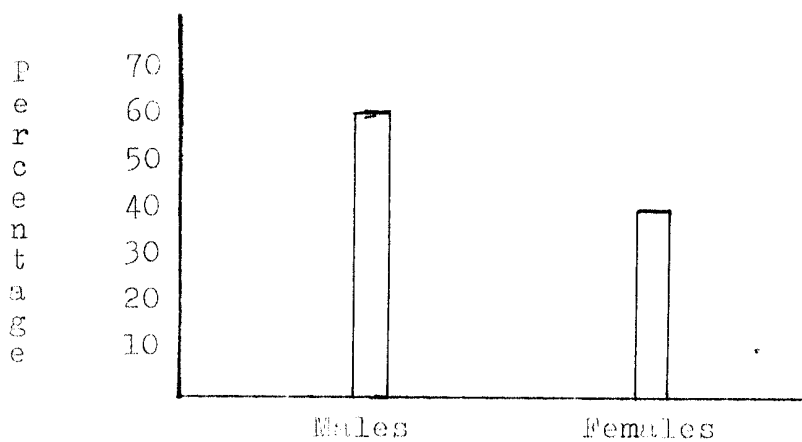


Graph (13): Age Incidence of acute cases

(1982)

Table (13): Seasonal & Sex Incidence of Acute Polio Cases attending I.P.R. in (1982).

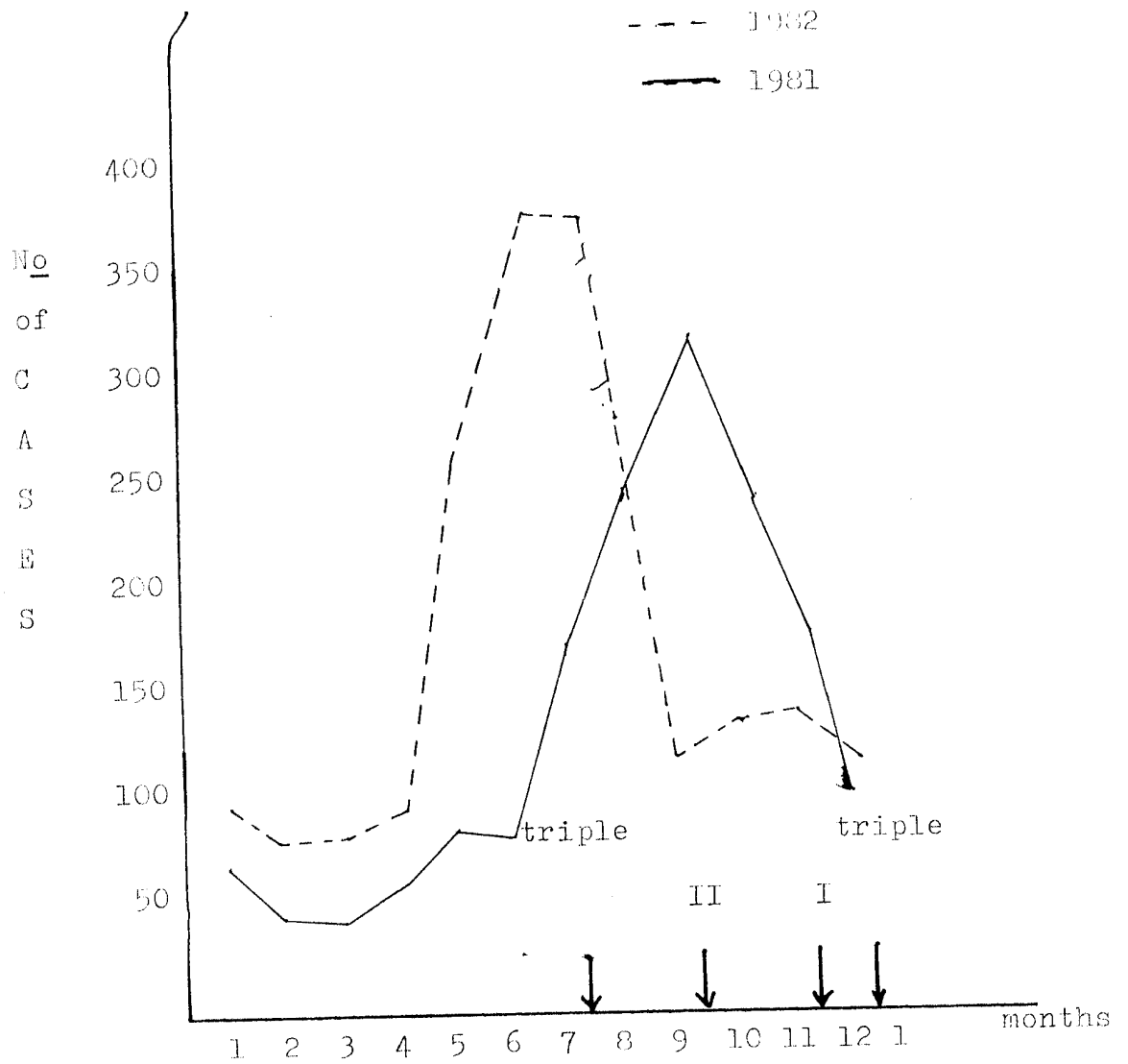
Month	Males	Females	Total
January	59	34	93
February	39	31	70
March	46	28	74
April	58	36	94
May	163	86	249
June	248	130	378
July	240	144	384
August	175	100	275
September	75	38	113
October	72	60	132
November	79	57	136
December	55	60	115
Total	1309	804	2113
Percentage	62 %	38 %	100 %



Graph (14): Percentage of Males & Females in acute cases (1982).

Table (14): Seasonal Incidence Of Acute Cases in 1982 compared to those in 1981.

Months	1981	1982
January	71	93
February	47	70
March	44	73
April	55	94
May	81	249
June	77	377
July	164	378
August	246	275
September	315	118
October	247	135
November	171	136
December	95	115



Graph (15): Seasonal Incidence of Cases in 1982 Compared to 1981.

Arrow indicates doses of vaccine given in selected localities of high incidence in 1982.

1 9 8 3

The 4th MVC that was carried out in the first quarter of 1983 (March ---- May), succeeded in bringing down the number of cases to 1022 after the sharp increase in cases during the previous year (2113). Three doses were given to all children from the age of 4 months up to 3 years. The period for each dose was 10 days. The interval between the doses was one month. Another MVC was conducted starting on December 1983.

(El Gamal et al., 1983)

Table (15), Graph (16) show that most cases did not receive at all or did not complete their vaccination either in regular or MVC.

① Geographical Distribution: Tab.(16), Gr. (17).

Giza took the upper hand as it represents 40 % of cases, Cairo 18.7 %, Kalubia 21.1 %, Menoufia 6.2 %, while the rest of the governorates 14 %.

② Age Incidence: Tab. (17), Gr. (18).

The age between 1 - 2 years represented the highest level (39 %) followed by the age below one year (38 %) There is a slight increase in age incidence below 3 months and above 4 years which can be considered as continuation of the previous epidemic. Maximum age is 6 years.

③ Sex Incidence: Tab. (18), Gr. (20).

Male : Female ratio was 3 : 2.

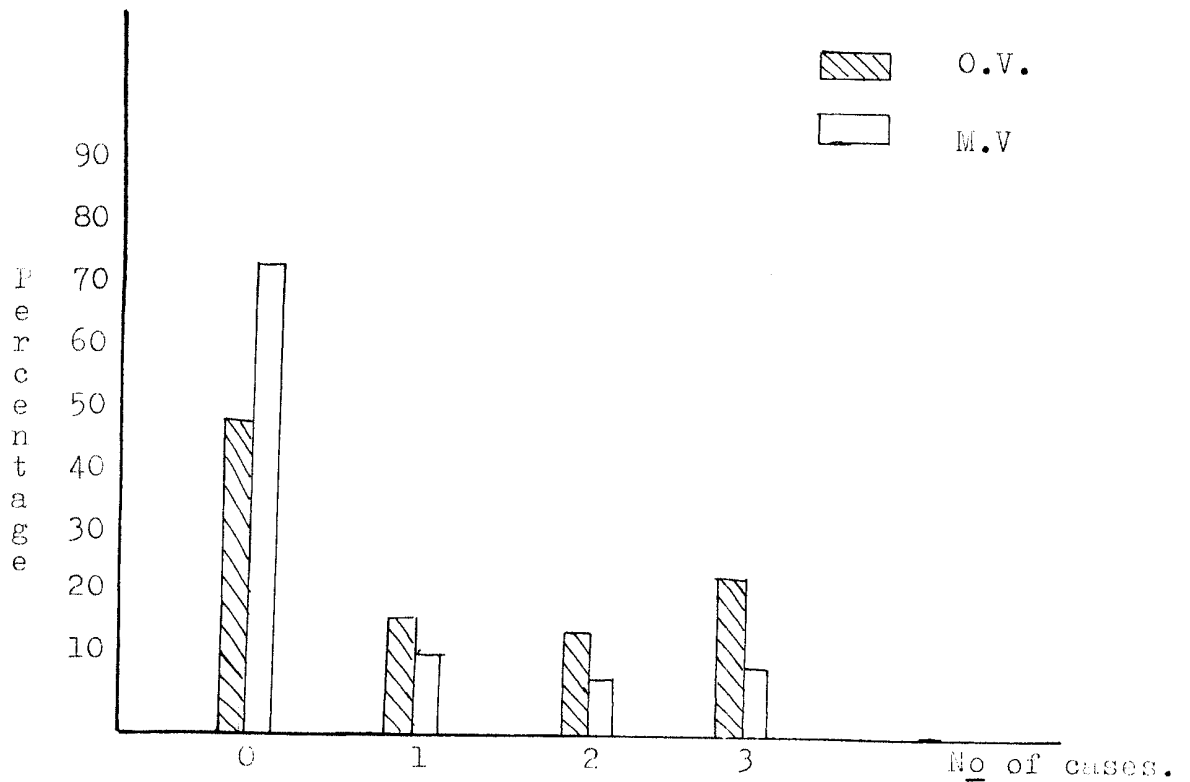
@ Seasonal Incidence: Tab. (18), Gr. (19).

The number of cases in the first three months was rising steadily from January reaching the peak at March, then a sudden fall was observed in April and the number of cases continued to be low during the summer months with a slight rise in August and another in November and then the number of cases came down abruptly in December.

This was explained by El-Gamal et al., (1983) as the continuation of the previous epidemic in 1982 in the first 3 months. After conducting the MVC, a sharp decline of cases was observed. The slight rise in number of cases in November might be explained by accumulation of new susceptibles, then there was a fall in December due to the 5th MVC. The number of cases attending the IPR from April to December 1983 was 659 cases, compared to 1834 cases during the same period in 1982.

Table (15): No of doses of poliovaccine received by acute polio cases attending IPR in (1983)

	D O S E S								
	Regular Vaccination					Mass Vaccination			
	0	1	2	3	4	0	1	2	3
<u>No</u> of cases	492	170	140	219	1	747	105	81	89
Percentage	48.2	16.6	13.7	21.4	0.1	73.1	10.3	7.9	8.7

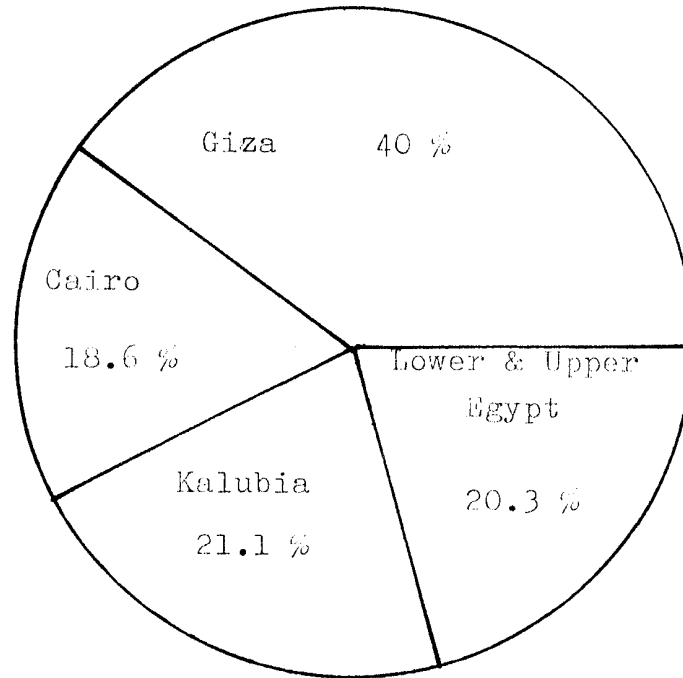


Graph (16): No of doses of poliovaccine received by acute cases attending IPR in (1983).

Table (16): Geographical Distribution of acute cases in (1983).

Governorate	No of cases
Cairo	191
Giza	409
Kalubia	216
Total	816
<u>Lower Egypt</u>	
Menoufia	75
Dakahlia	5
Sharkia	20
Gharbia	12
Behaira	14
Alexandria	2
Damietta	3
Port- Said	1
Ismailia	1
Suez	2
Sinai	1
Total	136
<u>Upper Egypt</u>	
Beni - Suef	13
Menya	7
Fayoum	28
Assiut	1
Suhag	7
Kena	10
Aswan	4
Total	70
Total for Egypt	1022

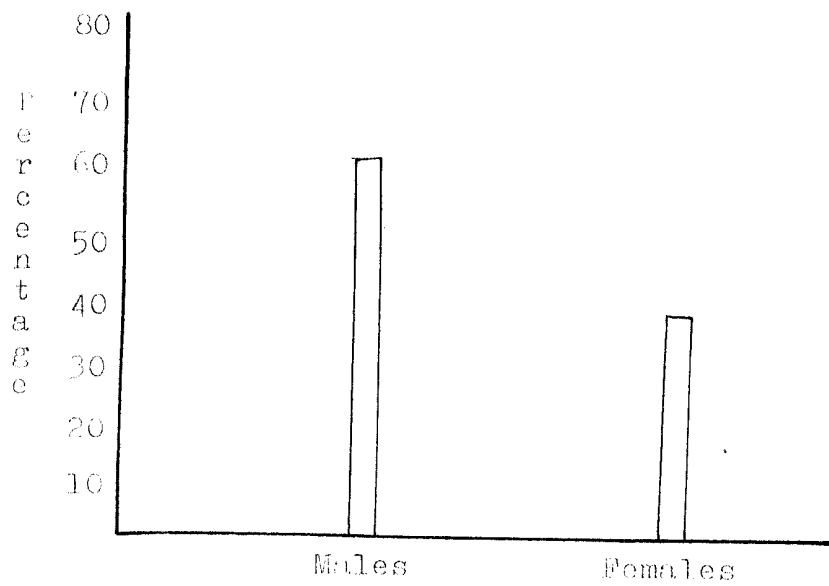
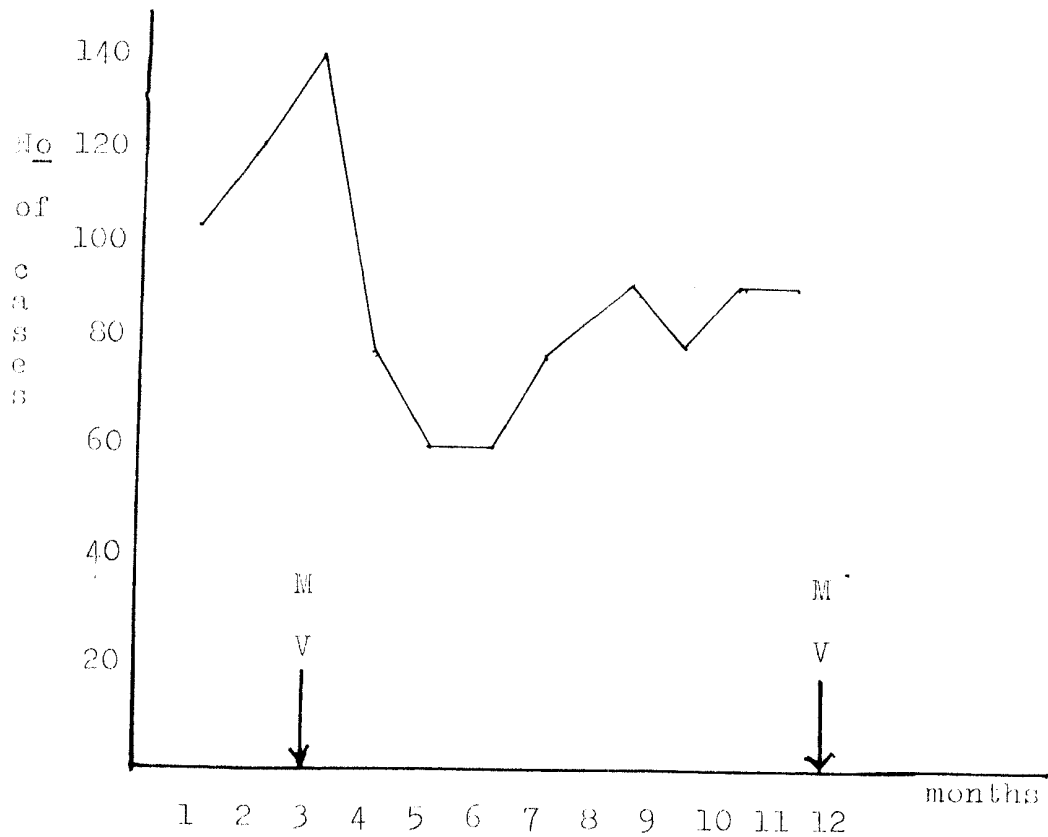
Graph (17): Geographical distribution of acute cases. (1983).



Months	Males	Females	Total
January	60	43	103
February	73	47	120
March	92	48	140
April	51	26	77
May	32	28	80
June	39	21	60
July	50	25	75
August	57	34	91
September	49	29	78
October	48	42	90
November	50	40	90
December	20	18	38
Total	621	401	1022
Percentage	60.8 %	39.2 %	100 %

Table (18): Seasonal Incidence of acute cases in (1983)

Graph (19): Seasonal Incidence of acute cases (1983)

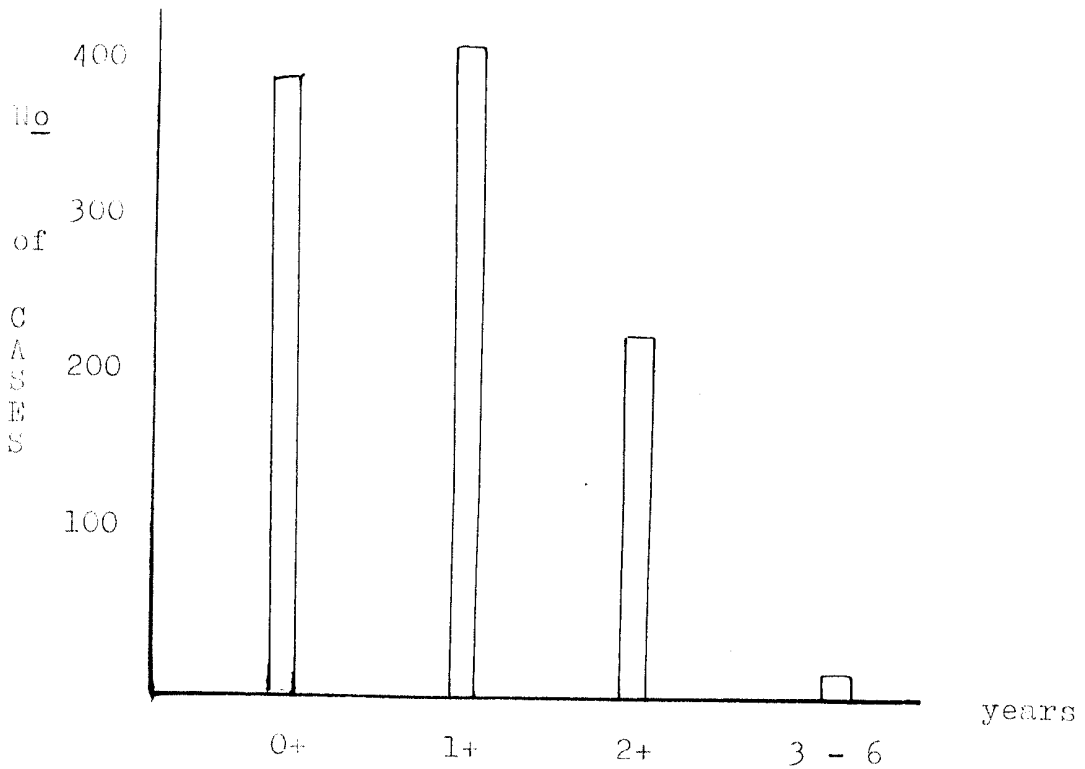


Graph (20): Percentage of Males & Females in acute cases

(1983)

Table (17): Age Incidence of acute cases (1983)

Age in years	0+	1+	2+	3--6	Total
Cases	388	401	221	12	1022
Percentage	38 %	39.2	21.6	1.2	100 %



Graph (18): Age Incidence of acute cases (1983)

1 9 8 4

The 5th MVC took place on December (1983) in 3 doses. The period for each dose was 6 days and the spacing between the doses was six weeks. The target population was children from 2 months of age up to 3 years (El Gamal et al., 1983). It seemed that the MVC had succeeded partially in decreasing the number of cases as it reached 699 cases throughout the whole year. Yet, still many people were indifferent to MVC and did not come forward to complete their infants' vaccination. Table 19, graph 21 show the high level (81.5 %) of the unvaccinated children during MVC among the acute cases.

⊙ Geographical Distribution: Tab. (20), Gr. (22).

Cases attending the IPR were as follows: Giza (41.8%), Cairo (20.7 %), Kalubia (19.4 %) and rest of governorates (18.1 %). Thus 81.9 % of the total number of cases came from Giza, Cairo and Kalubia. The number of cases from Lower Egypt (12.6 %) were more than those from Upper Egypt (5.4 %).

⊙ Age Incidence: Tab.(21), Gr. (23).

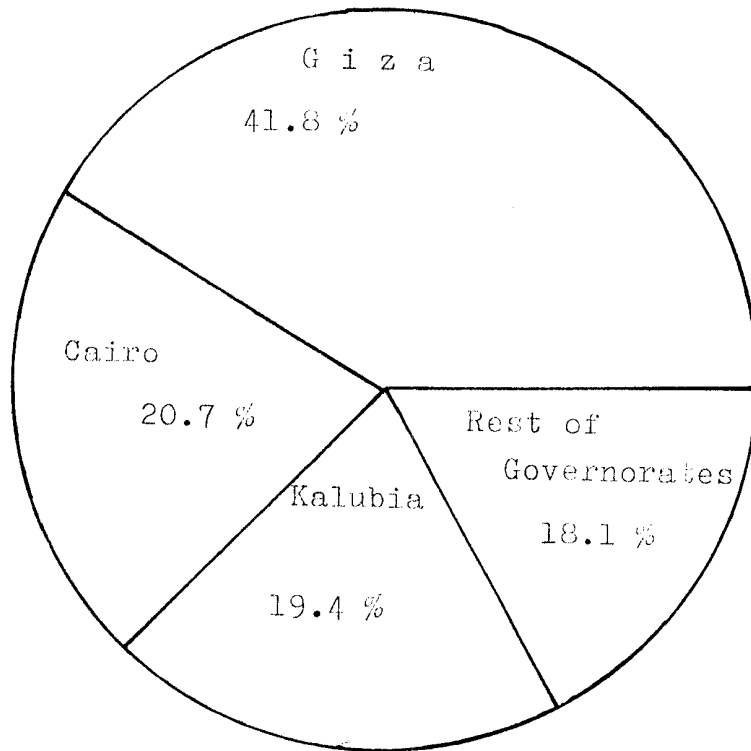
The age of onset was still below one year (47.9 %) followed by the age 1 - 2 years (35.8 %). The maximum age was 4 years and the minimum was 3 months.

© Sex Incidence: Tab. (22), Gr. (25).

There was still male preponderance and the ratio male : female was 4 : 3.

© Seasonal Incidence:

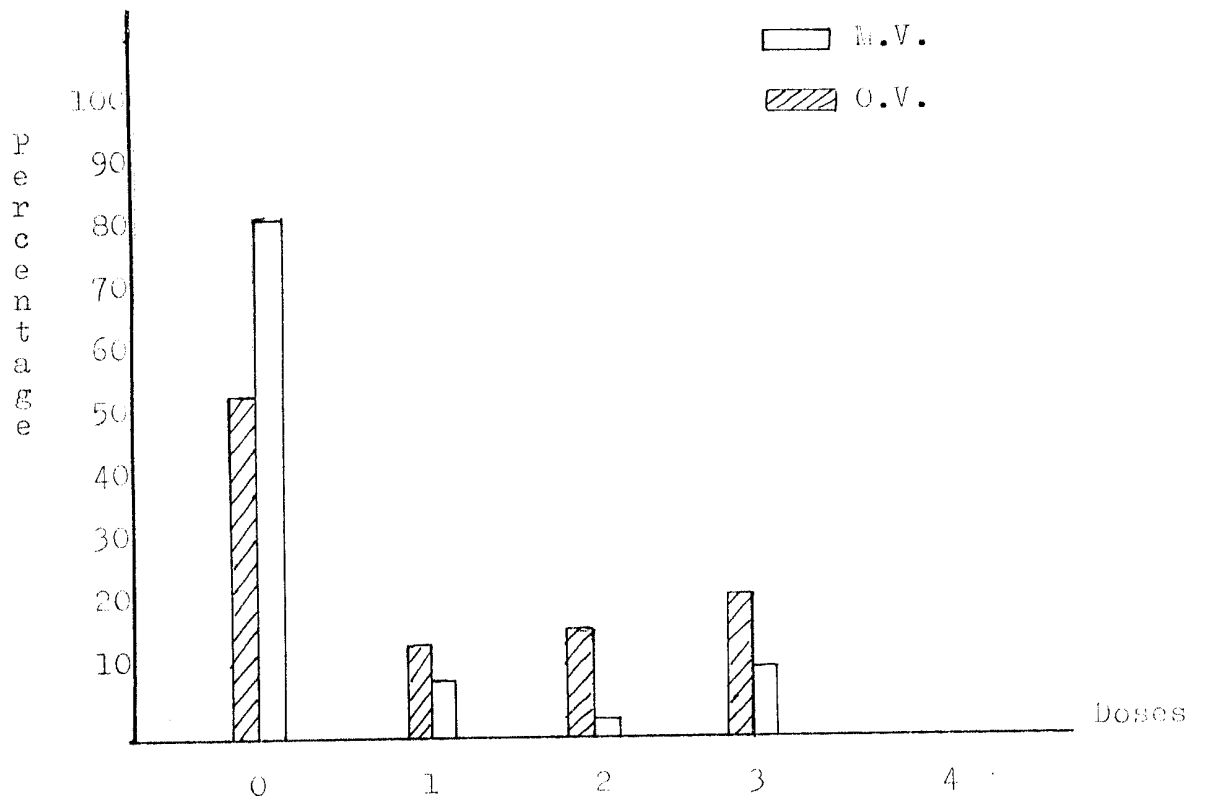
As shown in table 22 & graph 24, the curve was nearly horizontal till July where the number of cases rose rapidly, reaching the peak in October (159) then decreasing gradually till December.



Graph (22): Geographical Distribution of Acute cases (1984)

Table (19): No of doses of poliovaccine received by acute polio cases attending IPR in (1984)

	D O S E S							
	Regular Vaccination				Mass Vaccination			
	0	1	2	3	0	1	2	3
<u>No</u> of cases	369	90	93	147	570	53	23	53
Percentage	52.8	12.9	13.3	21	81.5	7.6	3.3	7.6



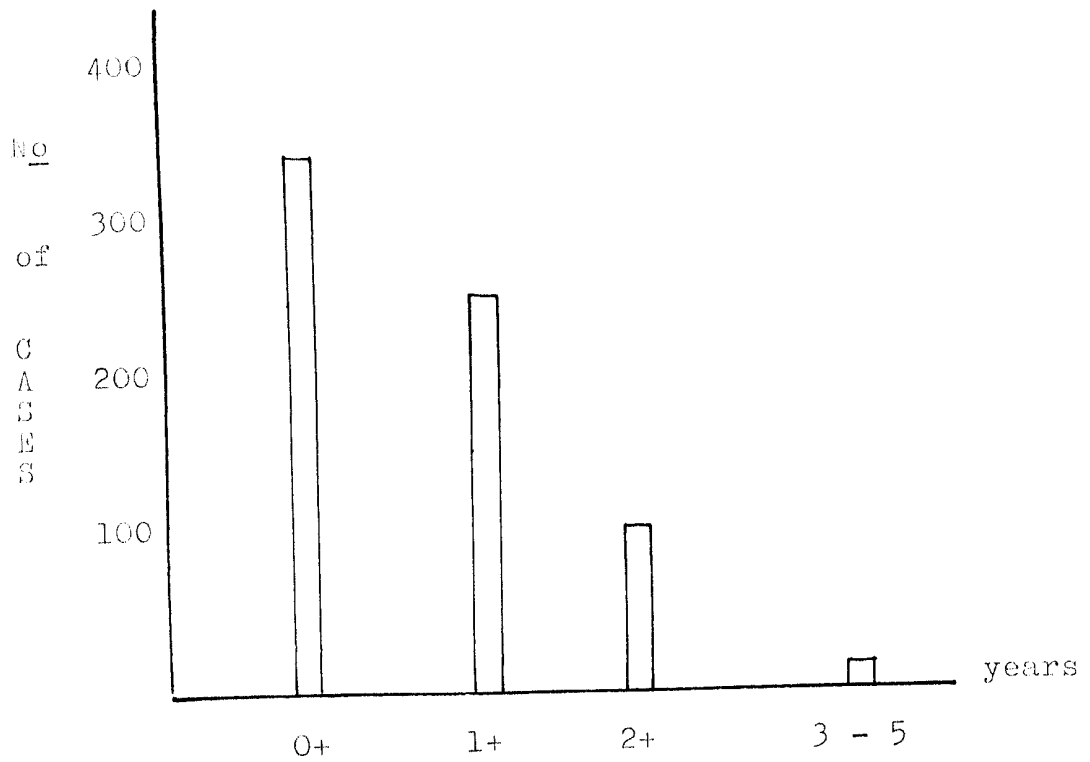
Graph (21): No of poliovaccine doses received by acute cases attending IPR in (1984)

Table (20): Geographical distribution of acute cases
in (1984).

Governorate	No of cases
Cairo	145
Giza	292
Kalubia	136
Total	573
<u>Lower Egypt</u>	
Menoufia	55
Dakahlia	11
Gharbia	2
Behaira	2
Damietta	1
Sharkia	11
Ismailia	6
Total	88
<u>Upper Egypt</u>	
Beni - suef	18
Menya	1
Fayoum	5
Suhag	3
Kena	10
Aswan	1
Total	38
Total for Egypt	699

Table (21): Age Incidence of acute cases (1984)

Age in years	0+	1+	2+	3-5	Total
No of cases	335	249	98	17	699
Percentage	47.9	35.8	13.8	2.5	100 %

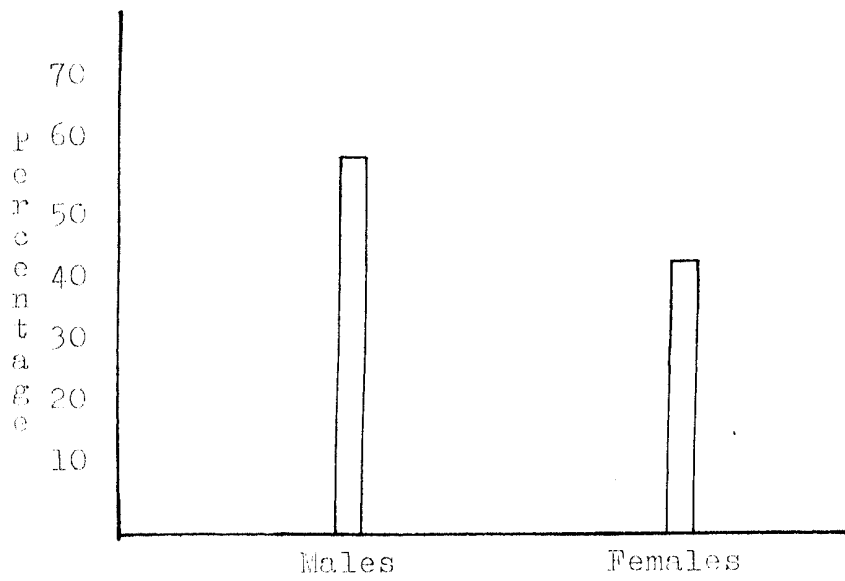
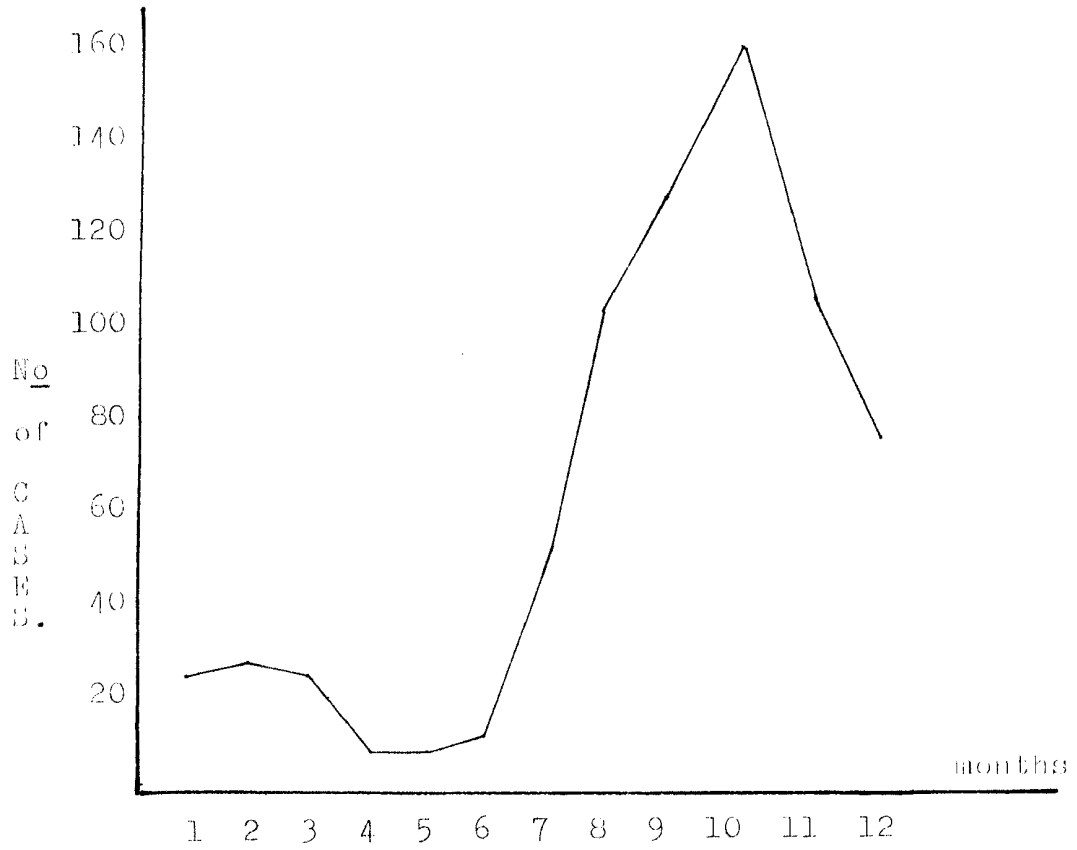


Graph (23): Age Incidence of acute cases in (1984)

Table (22): Seasonal & Sex Incidence of Acute Polio Cases attending I. P. R. in (1984)

	Males	Females	Total
January	13	16	29
February	18	6	24
March	14	8	22
April	3	4	7
May	3	4	7
June	6	5	11
July	24	28	52
August	64	37	101
September	67	60	127
October	97	62	159
November	64	41	105
December	32	43	75
Total	405	294	699
Percentage	57.9 %	42.1 %	100 %

Graph (24): Seasonal Incidence of Acute Cases in (1984)



Graph (25): Sex Incidence of cases in (1984)

1 9 8 5

The number of cases was 416. MVC started in March. Three doses were given to all children, the period for each dose was 6 days and the interval between the doses was one month.

@ Geographical Distribution: Tab.(24), Gr. (27).

As usual, Giza was the main source of cases attending the IPR (35.8 %), Cairo (17.5 %), Kalubia (24.8 %) & other governorates (21.9 %)

@ Age Incidence: Tab. (25), Gr. (28).

The disease was completely infantile, 48.6 % of cases lie between the age of 3 months and one year, and 30.4 % of cases between one and two years.

@ Sex Incidence: Tab. (25), Gr. (28).

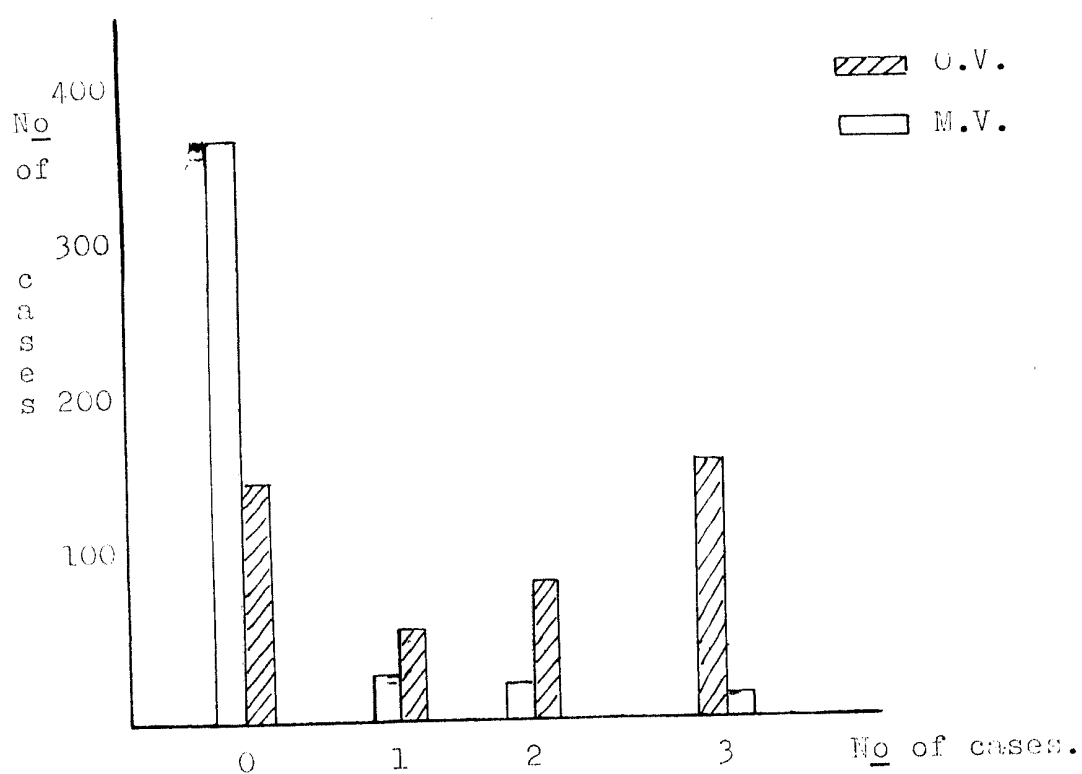
Male : Female ratio was 5 : 4.

@ Seasonal Incidence: Tab. (26), Gr. (29).

Unexpectedly the peak number of cases was in December, this was uncommon. It represented 20.4% of the total number of cases compared to 7.9 % in December 1983.

Table (23): No of doses of poliovaccine received by acute polio cases attending IPR in (1985).

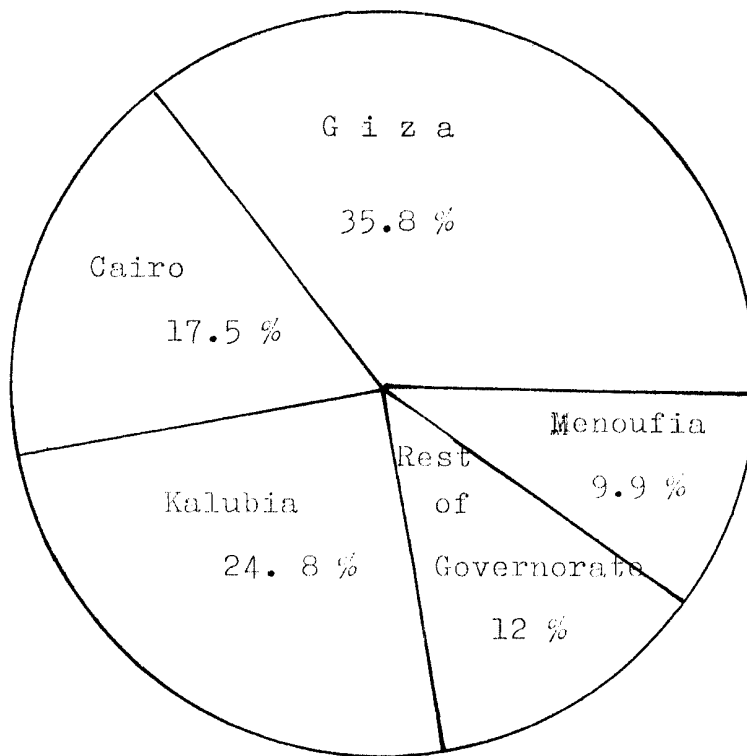
	D O S E S							
	Regular Vaccination				Mas Vaccination			
	0	1	2	3	0	1	2	3
<u>No</u> of cases	140	54	74	148	363	25	18	10
Percentage	33.7	13	17.8	35.5	87.3	6	4.3	2.4



Graph (26): No of poliovaccine doses received by acute cases attending IPR in (1985).

Table (24): Geographical Distribution of acute cases in (1985).

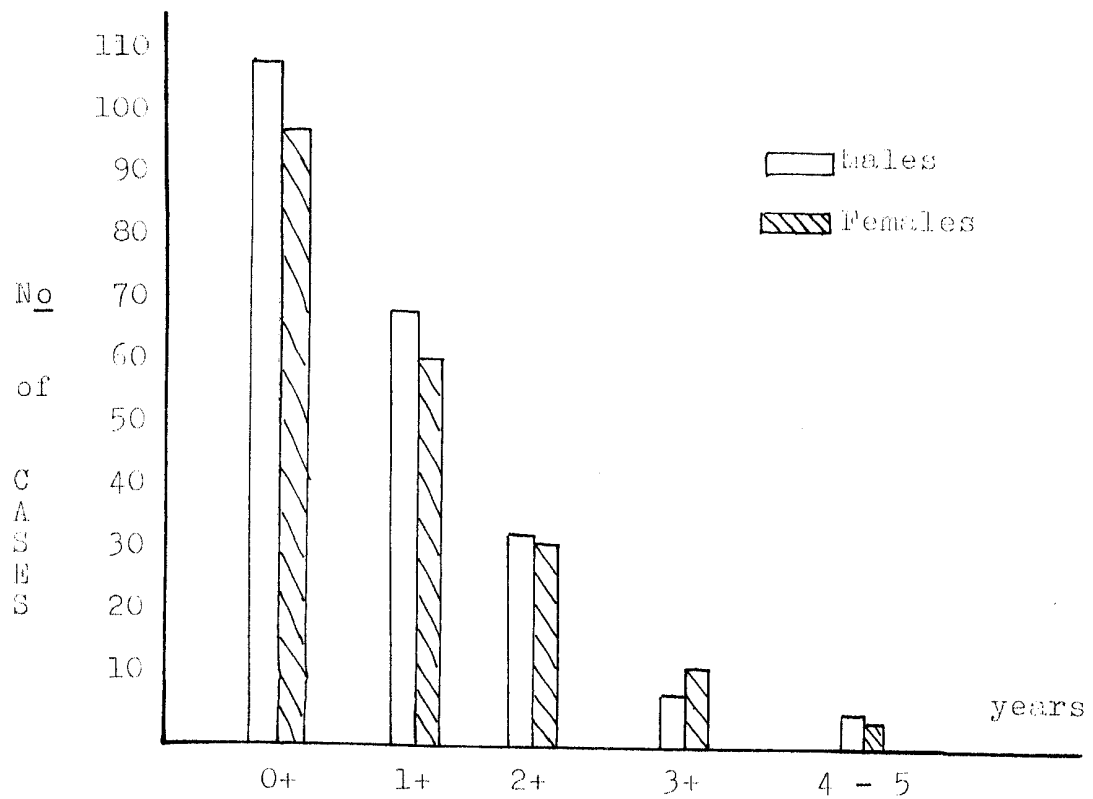
Governorate	No of cases
Giza	149
Cairo	73
Kalubia	103
Menoufia	41
Rest of Governorates	50
Total for Egypt	416



Graph (27); Geographical Distribution of acute cases (1985)

Table (25): Age & Sex Distribution of acute cases in
(1985)

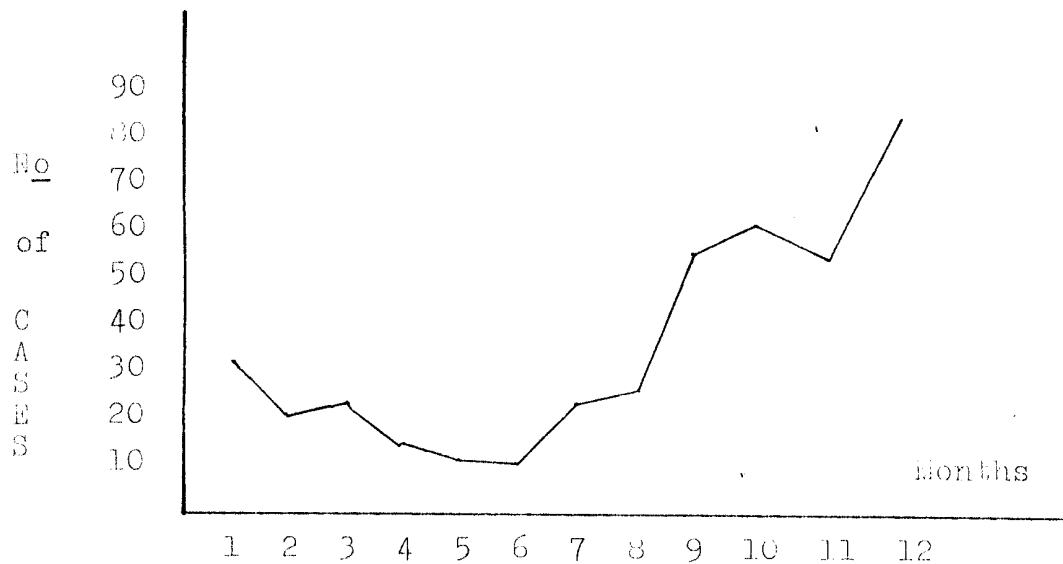
	0+	1+	2+	3+	4 - 5	Total
Males	108	67	31	7	4	217
Females	95	60	30	11	3	199
Total	203	127	61	18	7	416
Percentage	48.6	30.4	15	4.3	1.7	100 %



Graph (28): Age & Sex Incidence of acute cases in
(1985)

Table (26) : Seasonal Incidence of acute cases in (1985).

Month	No of cases
January	32
February	21
March	23
April	15
May	12
June	12
July	23
August	26
September	55
October	60
November	52
December	85
Total	416



Graph (29): Seasonal Incidence of acute cases in (1985)

1 9 8 6

The number of cases was 339, which was the lowest recorded level in Egypt since 1963. MVC started in February. Three doses of TOPV were given to children from 2 months till 3 years. The period for each dose was 6 days with a six weeks interval between each dose. Gharbia Governorate had a special MVC in February for all its children below 4 years of age. Tab.(27), Gr. (30).

① Geographical Distribution: Tab. (28), Gr. (31).

Cases attending IPR were as follows:

Giza (37.9 %), Kalubia (18.5 %), Cairo (18 %), the number of cases from Lower Egypt (13.5 %) were nearly as much as cases from Upper Egypt (13 %).

② Age Incidence: Tab. (29), Gr. (32).

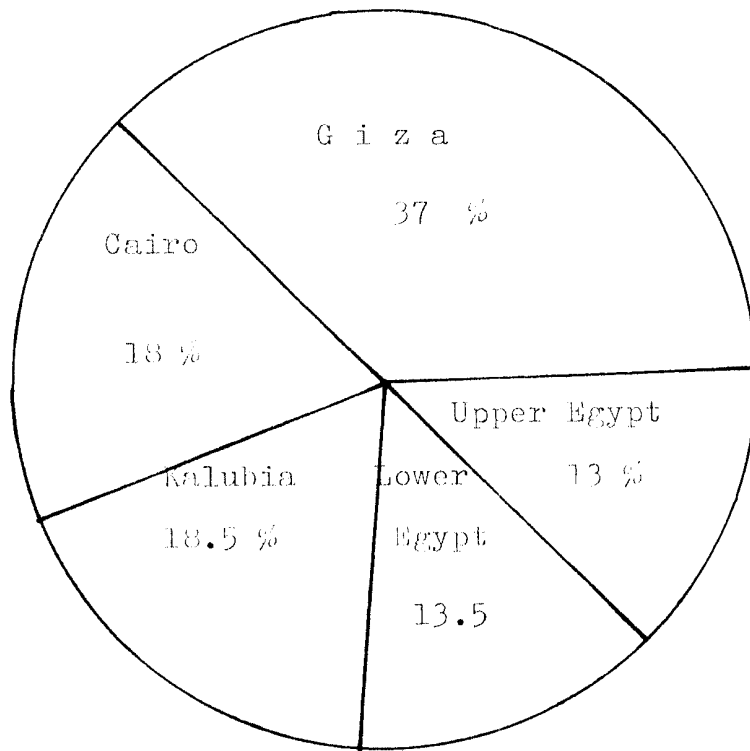
86 % of cases were below the age of 2 years. 11 cases occurred at the age 3 - 6 years (3.3 %).

③ Seasonal Incidence: Tab.(30), Gr. (33).

Contrary to the previous years, the peak of the cases was in January and February. The number of cases started dropping in March after the first dose of the MVC. Another peak appeared in November.

© Sex Incidence: Tab. (30), Gr. (34).

There was still male to female preponderance in the ratio 4 : 3.



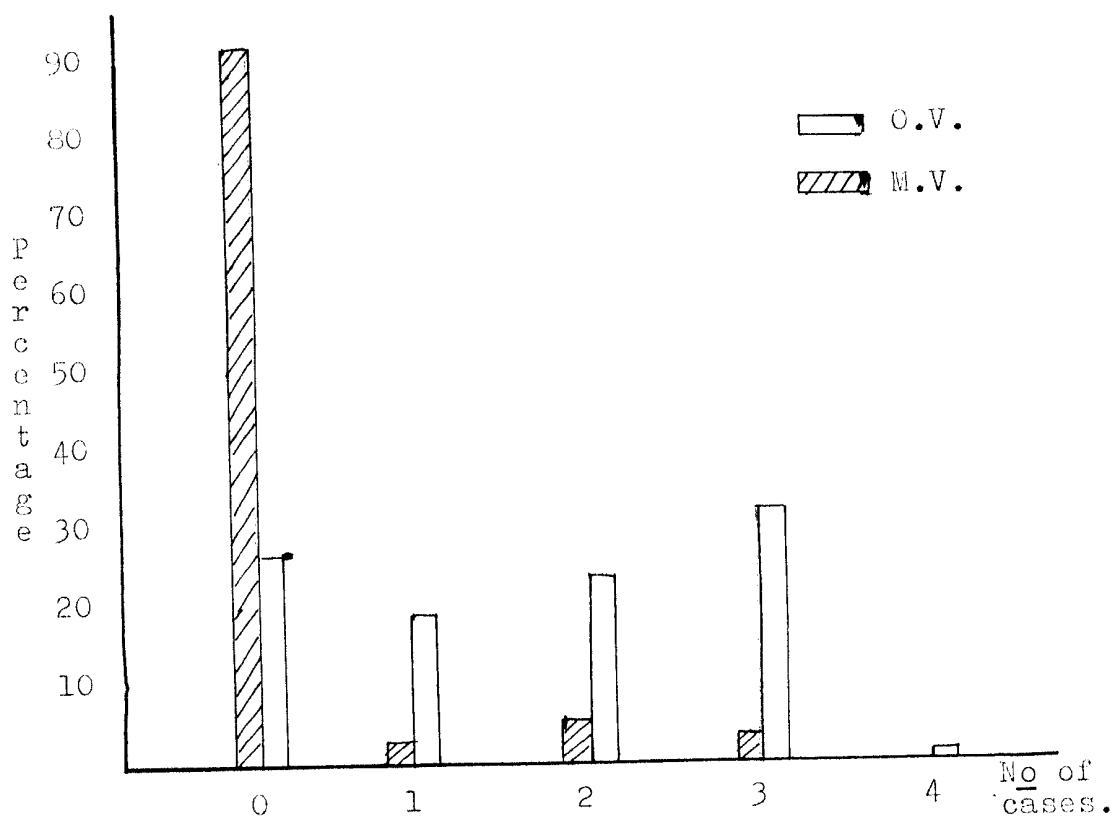
Graph (31): Geographical Distribution of acute cases in (1986)

Table (23): Geographical distribution of acute cases in (1986).

Governorate	No of cases
Giza	125
Cairo	61
Kalubia	63
Total	249
<u>Lower Egypt</u>	
Menoufia	32
Gharbia	2
Shurkia	7
Kafir - El - sheik	1
Damietta	1
Behaira	2
Dakahlia	1
Total	46
<u>Upper Egypt</u>	
Beni - suef	15
Menia	2
Fayoum	19
Suhag	3
Kena	4
New Valley	1
Total	44
Total for Egypt	339

Table (27): No of doses of poliovaccine received by acute polio cases attending IPR in (1986)

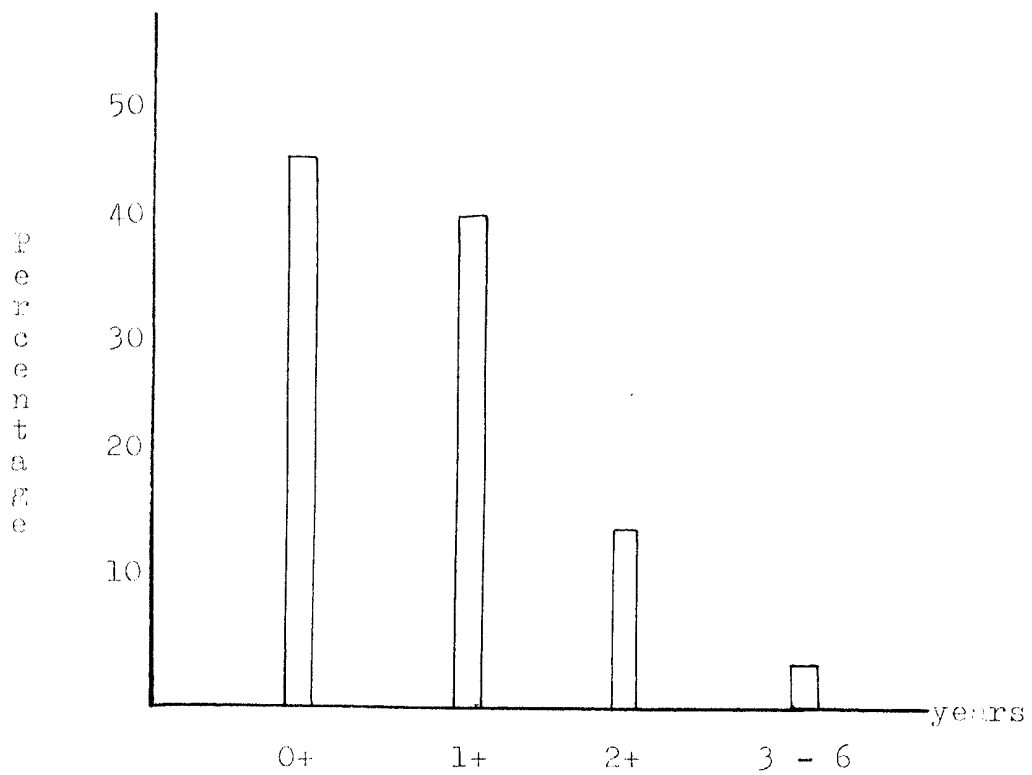
	D O S E S								
	Regular Vaccination					Mass Vaccination			
	0	1	2	3	4	0	1	2	3
<u>No</u> of cases	90	61	76	108	4	307	8	16	8
Percentage	26.5	18	22.5	31.8	1.2	90.5	2.4	4.7	2.4



Graph (30): No of poliovaccine doses received by acute cases attending IPR in (1986).

Table (29): Age Incidence of acute cases (1986)

Age in years	0+	1+	2+	3-6	Total
No of cases	192	133	43	11	339
Percentage	44.8	39.2	12.7	3.3	100 %

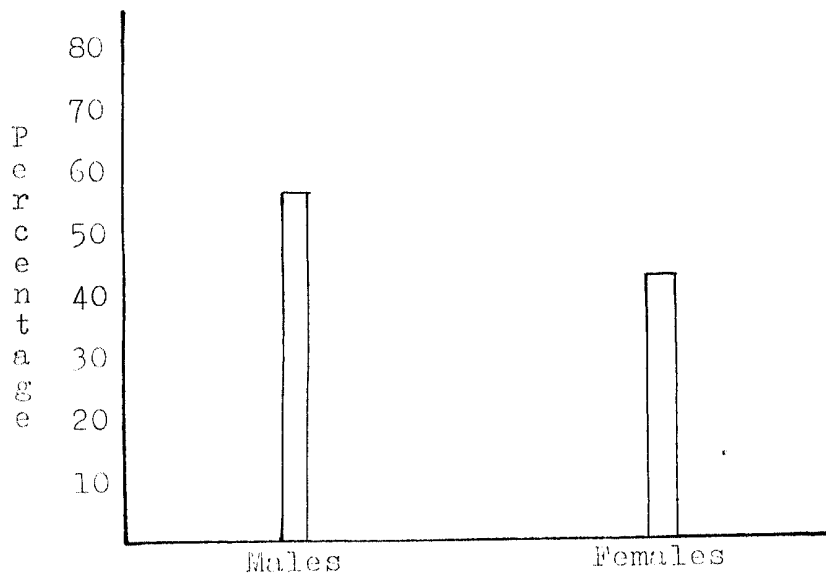
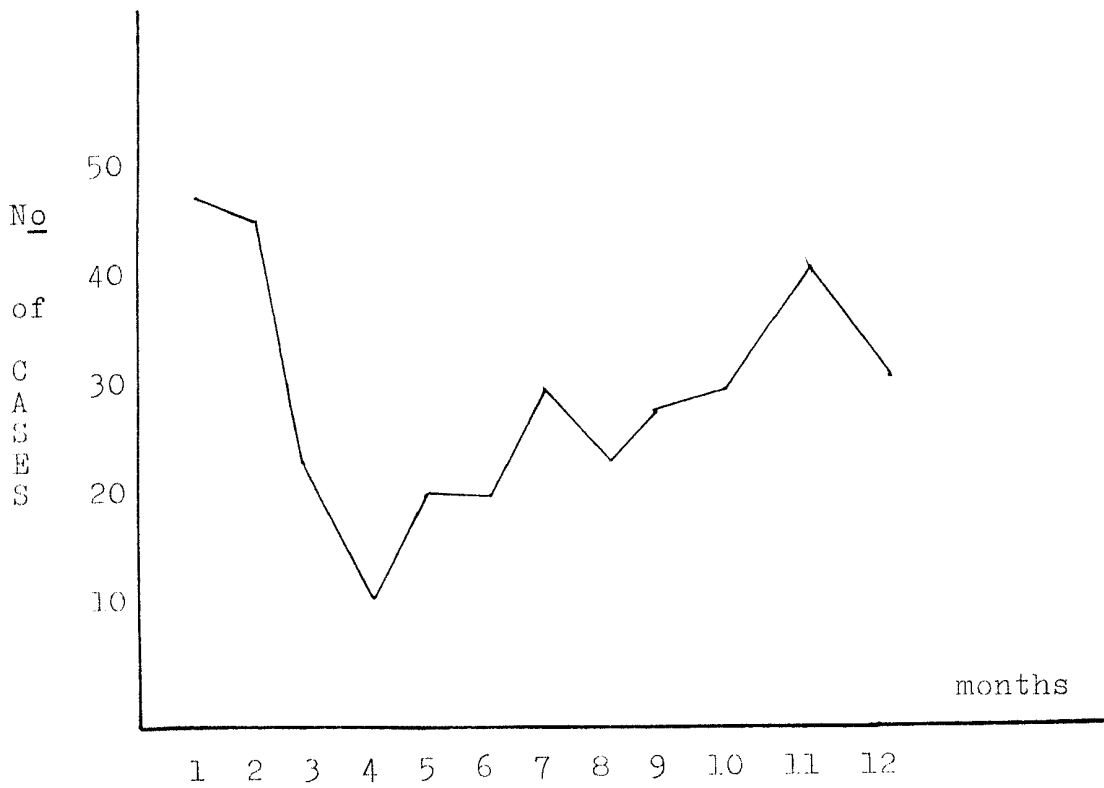


Graph (32): Age Incidence of acute cases (1986)

Table (30): Seasonal and Sex Incidence of acute polio cases attending IPR in (1986).

Months	Males	Females	Total
January	27	20	47
February	28	17	45
March	11	11	22
April	6	4	10
May	13	6	19
June	14	5	19
July	16	13	29
August	11	11	22
September	17	10	27
October	15	14	29
November	23	17	40
December	13	17	30
Total	194	145	339
Percentage	57.2 %	42.8 %	100 %

Graph (33): Seasonal Distribution of acute cases in 1986.



Graph (34): Sex Incidence of acute cases in 1986

1 9 8 7

The number of cases rose once again to 492. The majority of cases (81.5 %) were vaccinated 3 times in the normal obligatory vaccination schedule while only one case had a single dose of MVC. Tab.(31), Gr.(35).

@ Geographical Distribution: Tab. (32), Gr. (36).

Giza still took the upper hand in the number of cases attending IPR. They mounted up to 44.3 %, Kalubia came next (20.3 %), while Cairo number of cases retreated backwards to only 12.4 %, the same as those coming from Lower Egypt. Cases from Upper Egypt were only 10.6 %.

@ Age Incidence: Tab. (33), Gr. (37).

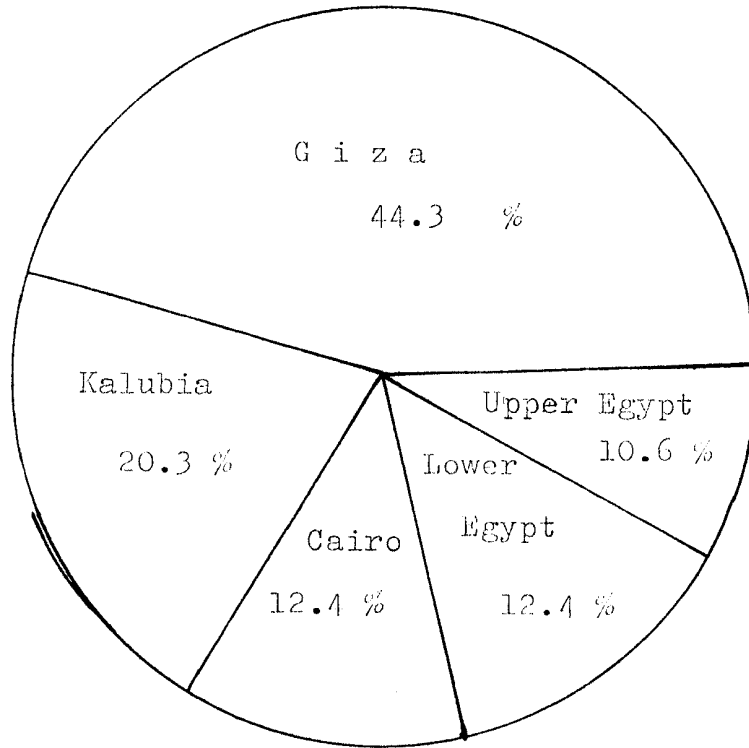
41 % of cases were below one year of age, 42.3 % were below 2 years i.e. the disease has still its infantile pattern. 7 cases (1.3 %) were at the age 4 --- 6 years.

@ Seasonal Incidence: Tab. (34), Gr. (38).

The curve was nearly horizontal in the first 5 months, then a sharp rise took place starting from June reaching the peak in July with gradual decline in the following months as shown in tab.(34), Gr. (38).

⑥ Sex Incidence: Tab.(34), Gr. (39).

As the previous, there is a male preponderance in the ratio 3 : 2, male : female.



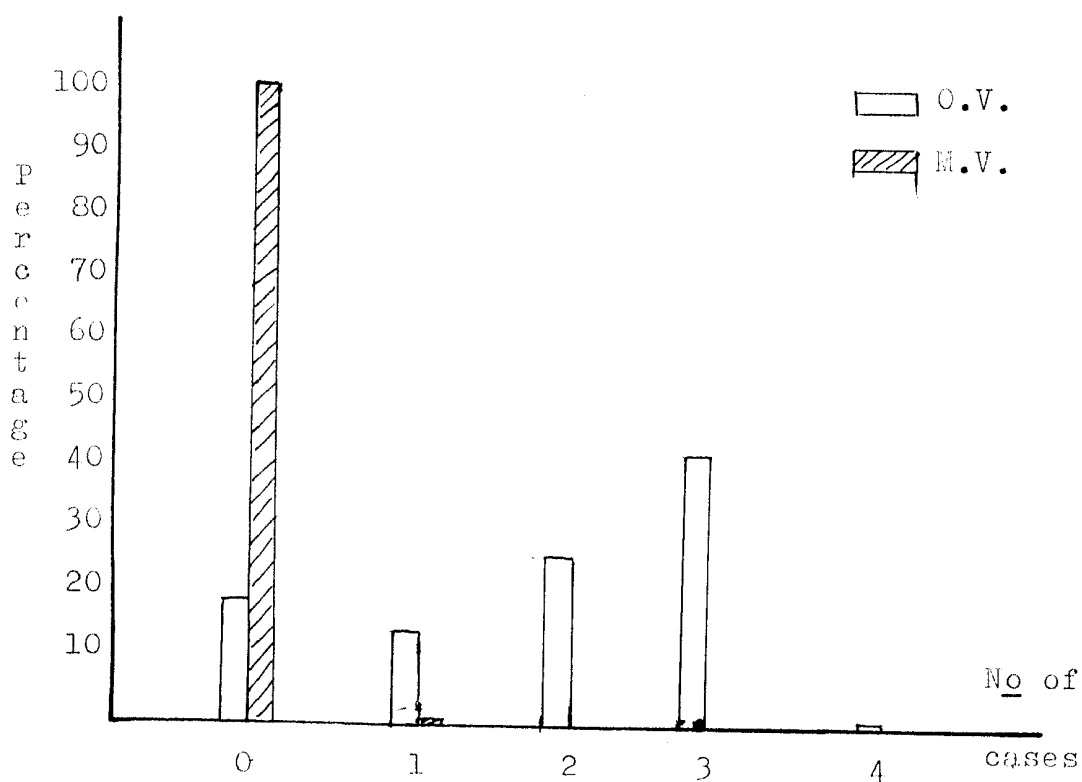
Graph (36): Geographical Distribution of acute cases in (1987).

Table (32): Geographical Distribution of acute poliocases attending the IPR in (1987).

Governorate	No of cases
Giza	218
Cairo	61
Kalubia	100
Total	379
<u>Lower Egypt</u>	
Menoufia	32
Dakahlia	9
Sharkia	12
Kafir-El-Sheik	2
Behaira	3
Ismailia	1
Gharbia	2
Total	61
<u>Upper Egypt</u>	
Beni - Suef	7
Menia	11
Fayoum	14
Suhag	6
Kena	10
Aswan	4
Total	52
Total for Egypt	492

Table (31): No of doses of poliovaccine received by acute polio cases attending IPR in (1987).

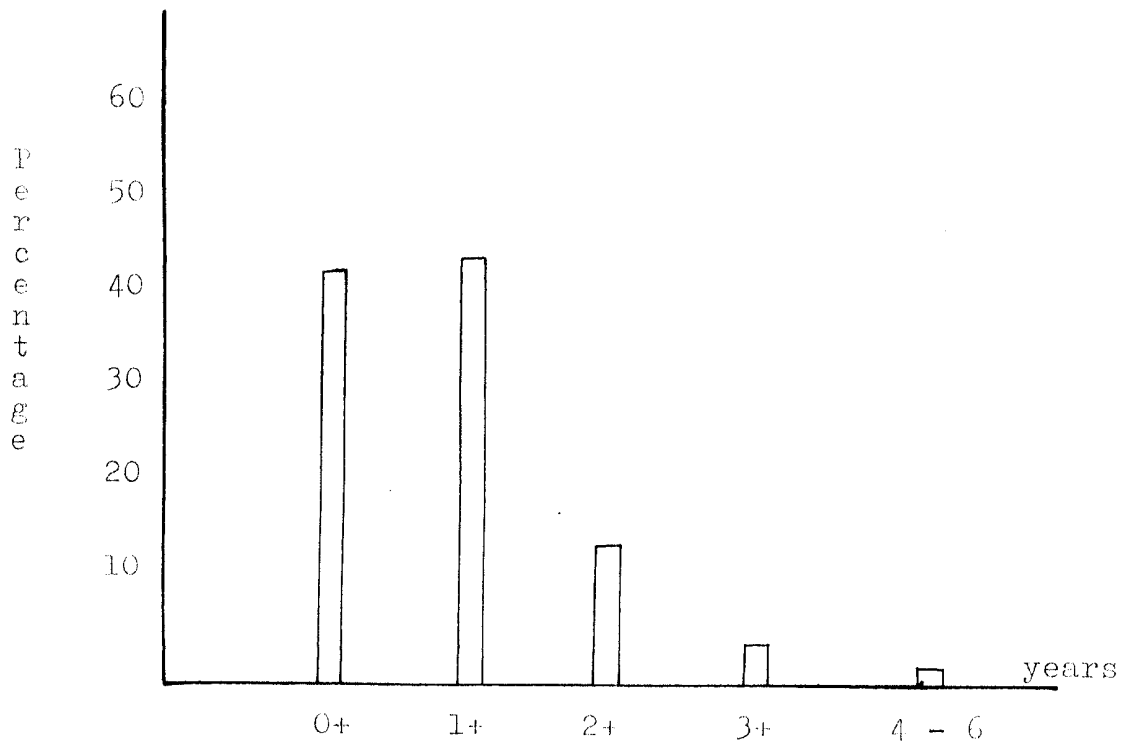
	D O S E S								
	Regular Vaccination					Mass Vaccination			
	0	1	2	3	4	0	1	2	3
<u>No</u> of cases	91	65	129	205	2	491	1	--	--
Percentage	18.5	13.2	26.2	41.7	0.4	99.8	0.2	--	--



Graph(35): No of poliovaccine doses received by acute cases attending IPR in (1987).

Table (33): Age Incidence of acute cases in (1987)

Age in years	0+	1+	2+	3+	4-6	Total
No of cases	202	209	59	17	7	492
Percentage	41	42.3	12	3.4	1.3	100 %

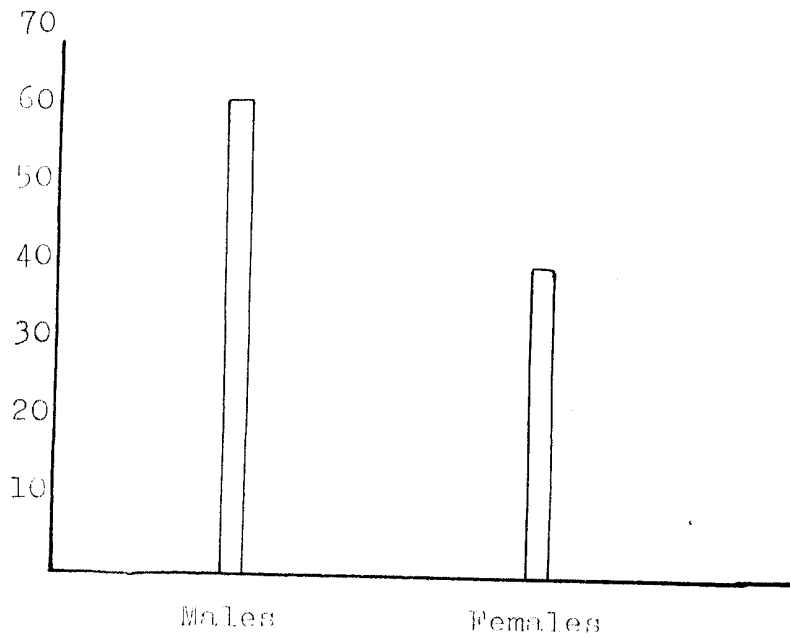
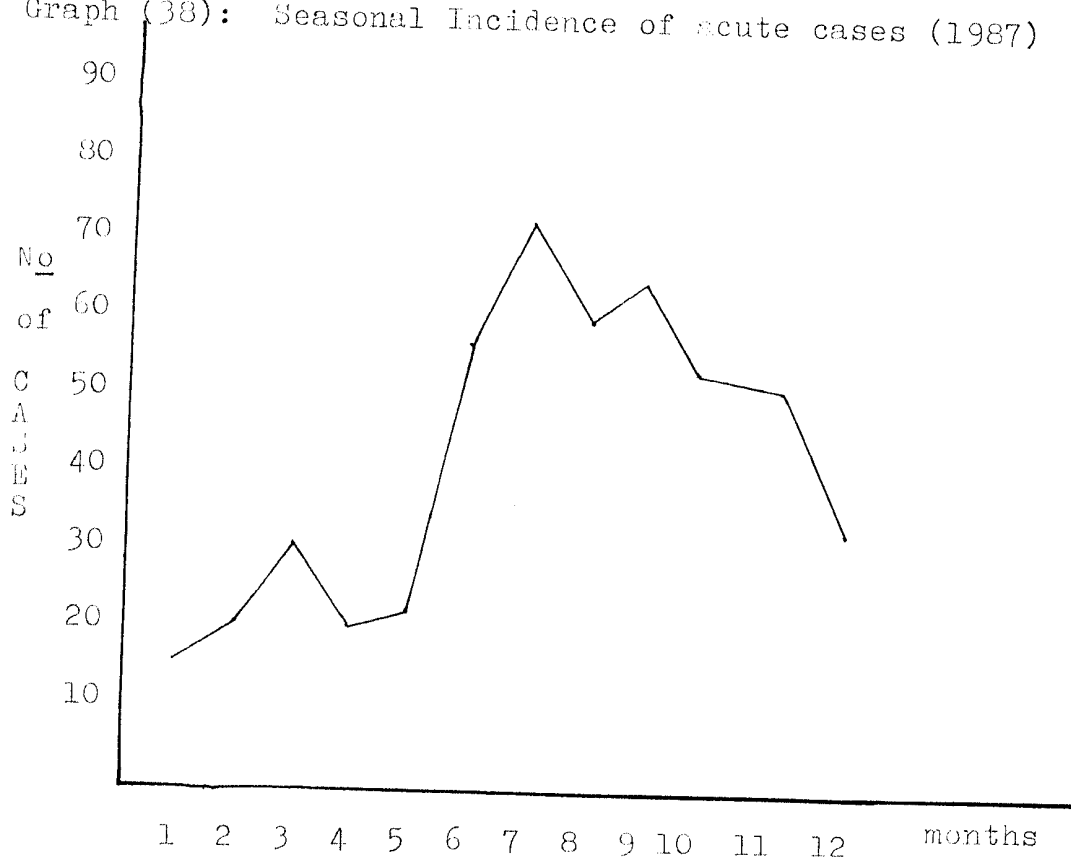


Graph (37): Age Incidence of acute cases in (1987)

Months	Males	Females	Total
January	12	4	16
February	9	11	20
March	17	13	30
April	14	6	20
May	17	5	22
June	35	21	56
July	42	29	71
August	38	21	59
September	42	22	64
October	30	22	52
November	24	26	50
December	17	15	32
Total	297	195	492
Percentage	60.3 %	39.7 %	100 %

Table (34): Seasonal and Sex Incidence in acute Polio cases attending IPR in (1987).

Graph (38): Seasonal Incidence of acute cases (1987)



Graph (39): Sex Incidence of acute cases in (1987).

1 9 8 8

The number of cases went down back to (416) as in the year 1985. 126 cases (30.3 %) were not vaccinated at all in the O.V, (37.8 %) received the 3 doses and the rest partial doses (1 or 2). No M.V.C. took place that year, and the affected children did not receive any doses in the previous M.V. Tab. (35), Gr. (40).

@ Geographical Distribution:

Cases attending IPR were distributed as shown in table (36) & Graph (41): Giza 34.8 %, Kalubia (24.4 %), Cairo (10.8 %), Lower Egypt (18.5 %) were 11.5 % of them came from Menoufia governorate and 7 % were from the rest governorates. Upper Egypt cases were 11.5 %.

@ Age Incidence:

For the first time 3 cases appeared in the ages 10, 11 years. Apart from those 3 cases, the disease was nearly completely infantile as 84.3% of cases were below 2 years of age as shown in table (37) and Graph (42).

@ Seasonal Incidence: Tab.(38), Gr. (43).

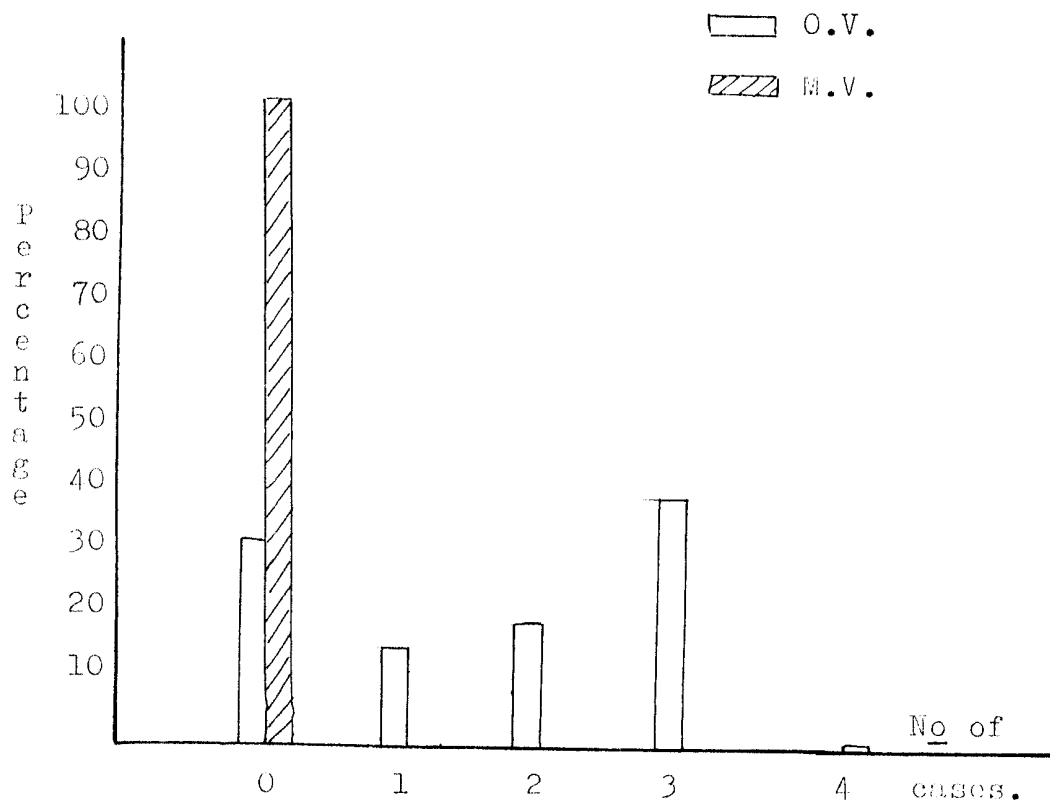
A very high incidence took place in Summer and Autumn.

@ Sex Incidence: Tab.(38), Gr. (44).

Males were more susceptible to the disease than females in the ratio 3 : 2.

Table (35): No of doses of poliovaccine received by acute polio cases attending IPR in (1988)

	D O S E S								
	Regular Vaccination					Mass Vaccination			
	0	1	2	3	4	0	1	2	3
<u>No</u> of cases	126	56	75	157	2	416	--	--	--
Percentage	30.3	13.4	18	37.8	0.5	100	--	--	--

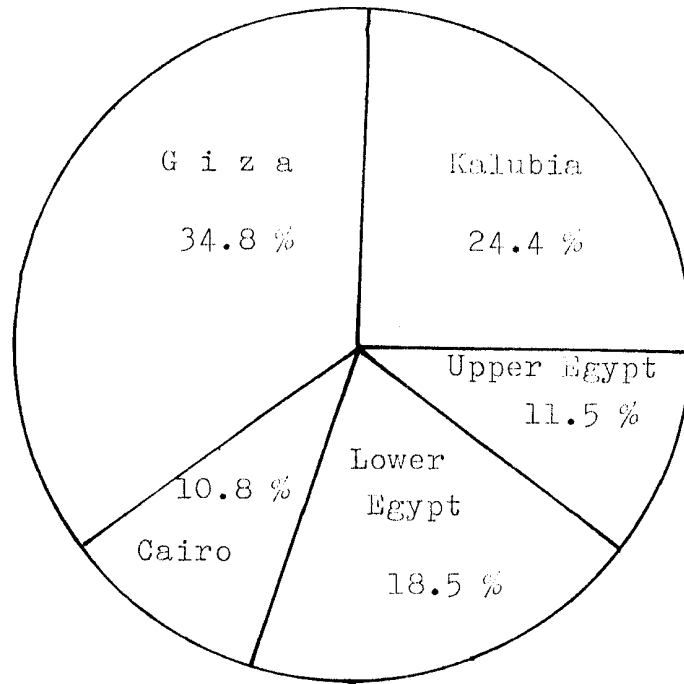


Graph (40): No of poliovaccine doses received by acute cases attending IPR in (1988).

Table (36): Geographical Distribution of Acute polio cases attending IPR in (1988).

Governorate	No of cases
Giza	145
Cairo	45
Kalubia	101
Total	291
<u>Lower Egypt</u>	
Menoufia	49
Behaira	4
Kufr-El-Sheik	2
Suez	1
Sharkia	13
Dakahlia	6
Alexandria	1
Gharbia	1
Total	77
<u>Upper Egypt</u>	
Beni-Suef	9
Menia	4
Payoum	25
Assiut	1
Suhag	4
Kena	4
Aswan	1
Total	48
Total for Egypt	416

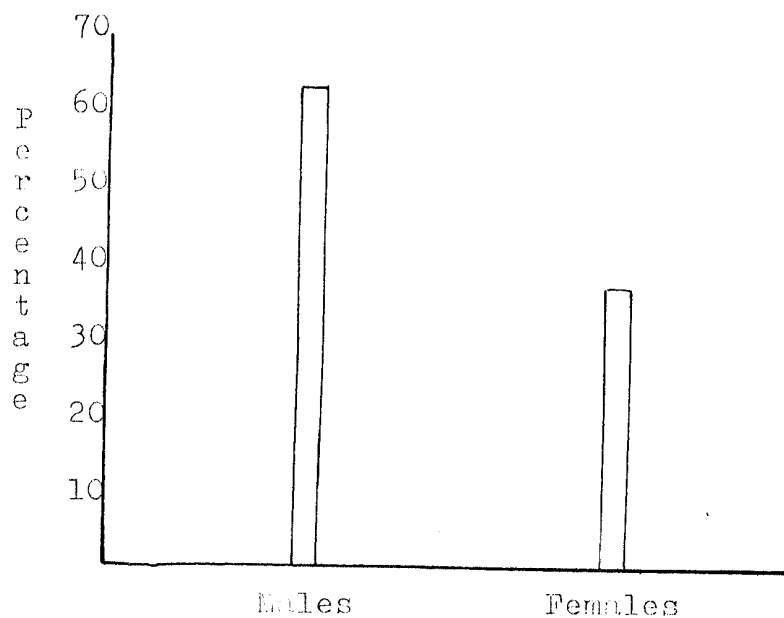
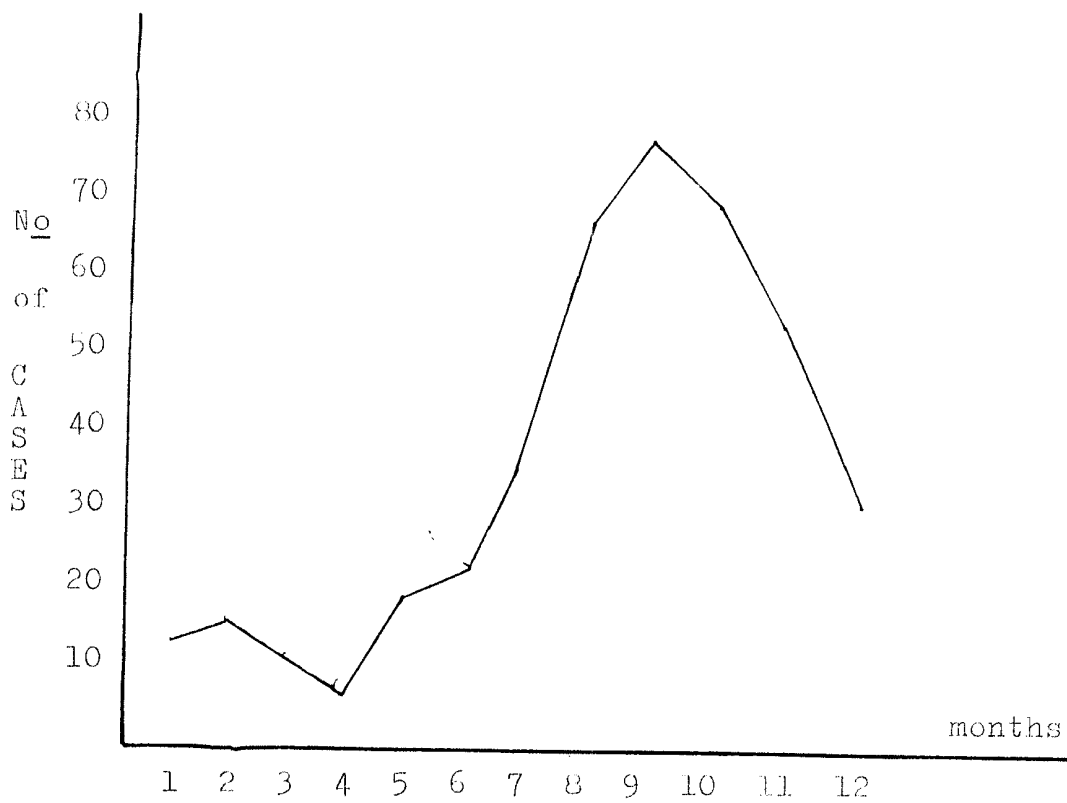
Graph (41): Geographical Distribution of acute cases
in (1988).



Months	Males	Females	Total
January	10	3	13
February	11	5	16
March	4	6	10
April	2	4	6
May	10	8	18
June	15	7	22
July	24	11	35
August	44	23	67
September	43	34	77
October	45	24	69
November	34	19	53
December	19	11	30
Total	261	155	416
Percentage	62.7 %	37.3 %	100 %

Table(38): Seasonal & Sex Incidence of acute cases (1988).

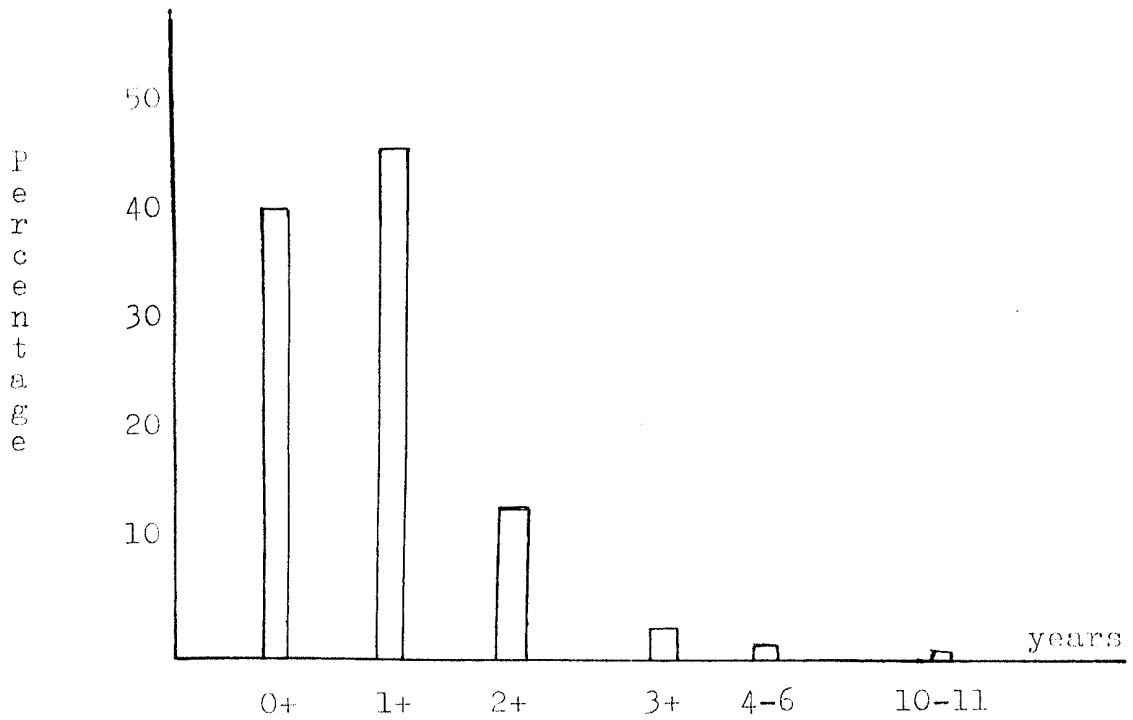
Graph (43): Seasonal Incidence of acute cases in (1988)



Graph (44): Sex Incidence of acute cases in (1988).

Table (37): Age Incidence of acute cases (1988)

Age in years	0+	1+	2+	3+	4-6	10-11	Total
No of cases	164	187	48	10	4	3	416
Percentage	39.4	44.9	11.6	2.4	1	0.7	100%



Graph (42): Age Incidence of acute cases (1988).

1 9 8 9

The total number of cases continued declining down to 384 cases around the year. There was no M.V. for the second year, but in spite of that the number of cases were less than the previous year. 155 cases i.e.(40.4%) received their 3 TOPV, 23.4% received partial doses 1 or 2 and 35.2% were unvaccinated. Tab.(39, Gr. (45)

@ Geographical Distribution: Tab. (40), Gr. (46).

Giza still presented the highest incidence of cases (42.7 %), Kalubia (21.4 %), Cairo (13.5%), Lower Egypt (13.3 %) and Upper Egypt (9.1 %).

@ Age Incidence: Tab. (41), Gr. (47).

The age incidence receded back to its previous pattern. There were no cases above 6 years. The highest incidence 45.4 % was between 1 - 2 years. 33 % was below one year of age.

@ Seasonal Incidence: Tab. (42), Gr. (48).

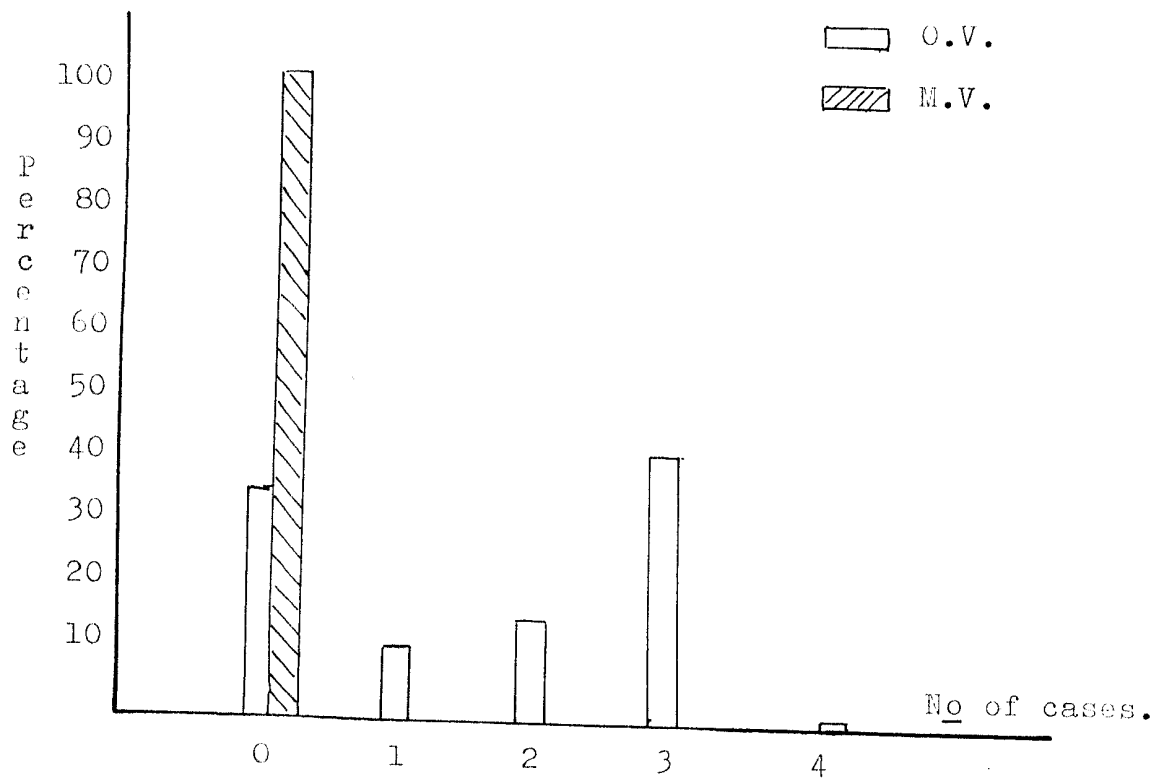
The number of cases started to rise in July reaching the peak in September and October then gradually decreasing in the last 2 months of the year.

@ Sex Incidence: Tab. (42), Gr. (49).

The Males were more susceptible to the disease in the ratio 3 : 2, Males : females.

Table (39): No of doses of poliovaccine received by acute polio cases attending IPR in (1989).

	D O S E S									
	Regular Vaccination					Mass Vaccination				
	0	1	2	3	4	0	1	2	3	
<u>No</u> of cases	135	35	55	155	4	384	--	--	--	
Percentage	35.2	9.1	14.3	40.4	1	100	0	0	0	

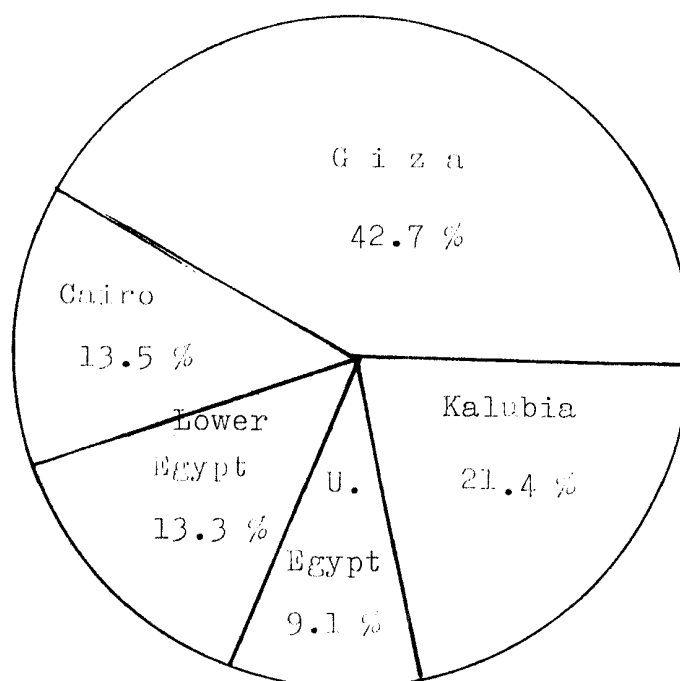


Graph (45): No of poliovaccine doses received by acute cases attending IPR in (1989).

Table (40): Geographical Distribution of acute polio cases attending IFR in (1989).

Governorate	No of cases
Giza	164
Cairo	52
Kalubia	82
Total	298
<u>Lower Egypt</u>	
Menoufia	23
Dakahlia	4
Behaira	6
Sharkia	3
Gharbia	6
Kafr-El- Sheik	2
Damietta	3
Alexandria	1
Suez	1
Ismailia	2
Total	51
<u>Upper Egypt</u>	
Beni-Suef	9
Menia	6
Fayoum	9
Assiut	3
Suhag	3
Kena	1
Aswan	4
Total	35
Total for Egypt	384

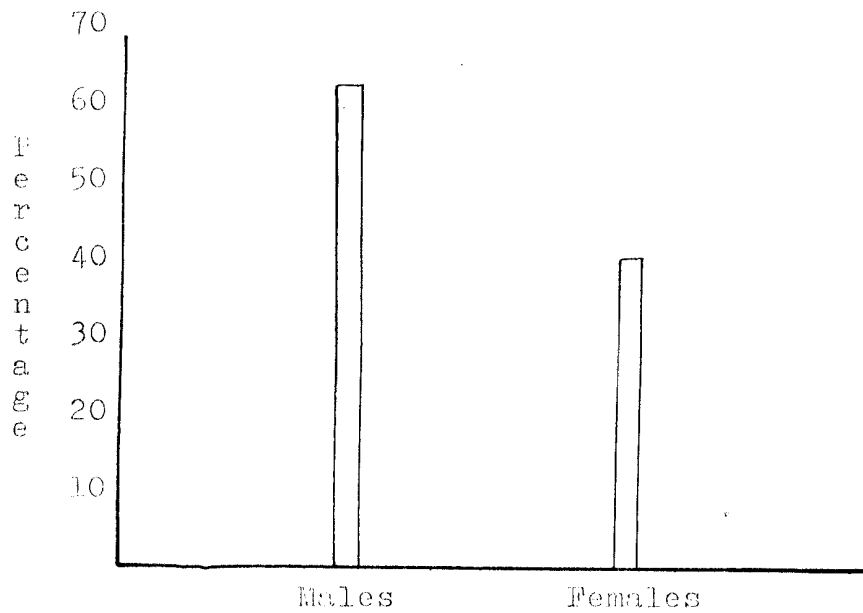
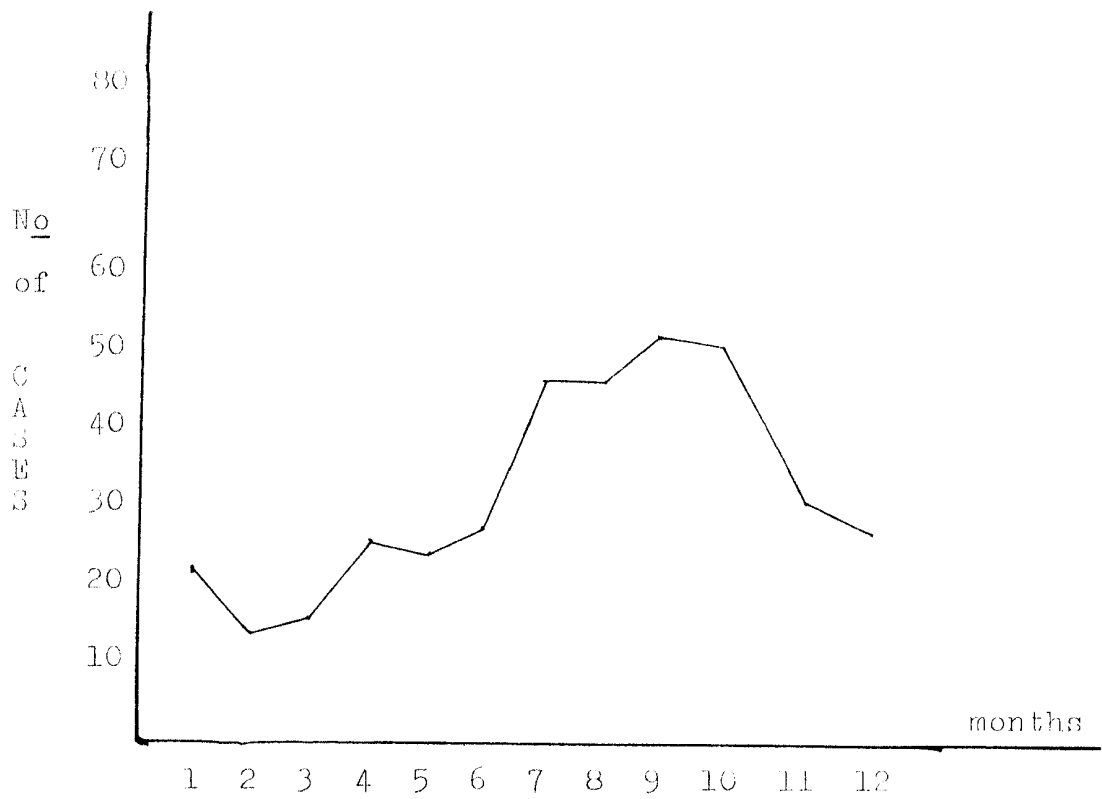
Graph(46): Geographical Distribution of acute cases in (1989).



Months	Males	Females	Total
January	13	8	21
February	6	8	14
March	9	7	16
April	13	13	26
May	14	10	24
June	17	10	27
July	31	16	47
August	31	16	47
September	35	18	53
October	29	23	52
November	18	12	30
December	16	11	27
Total	232	152	384
Percentage	60.4	39.6 %	100 %

Table (42): Seasonal & Sex Incidence of acute cases (1989)

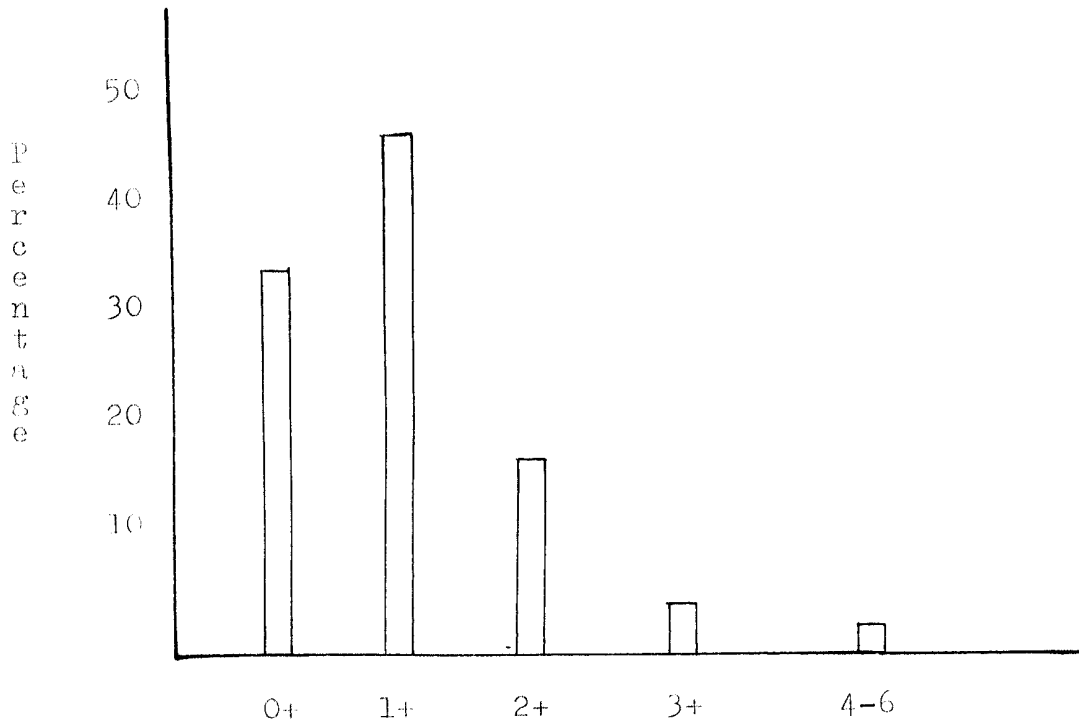
Graph (48): Seasonal Incidence of acute cases in (1989)



Graph (49): Sex Incidence of acute cases in (1989).

Table (41): Age Incidence of acute cases in (1989).

Age in years	0+	1+	2+	3+	4-6	Total
No of cases	127	174	60	15	8	384
Percentage	33	45.4	15.6	3.9	2.1	100 %



Graph (47): Age Incidence of acute cases in (1989)

1 9 9 0

No of cases was similar to the previous year 383 in spite of the efforts of the Ministry of Health in fighting the disease. The Ministry plans to eliminate the disease by the year 1994. The majority of cases received either the 3 doses of the vaccine (50.3%) or were partially vaccinated, 1 --- 2 doses (22.7 %). M.V.C. was in the form of one TOPV that took place in June to the children from 2 months ---- 5 years old. Only 4.2 % of cases received this additional dose. Tab.(43),Gr.(50)

@ Geographical Distribution: Tab. (44), Gr. (51).

Cases from the 3 main Governorates were 68.7 %, and for the 1st time in the 10 years cases from Upper Egypt (16.4%) were more than those in Lower Egypt (14.9%).

@ Age Incidence: Tab. (45), Gr. (52).

Cases started from the age of 3 months till 5 years, with its usual infantile pattern, as 82.8% of cases were below 2 years.

@ Seasonal Incidence: Tab. (46), Gr. (53).

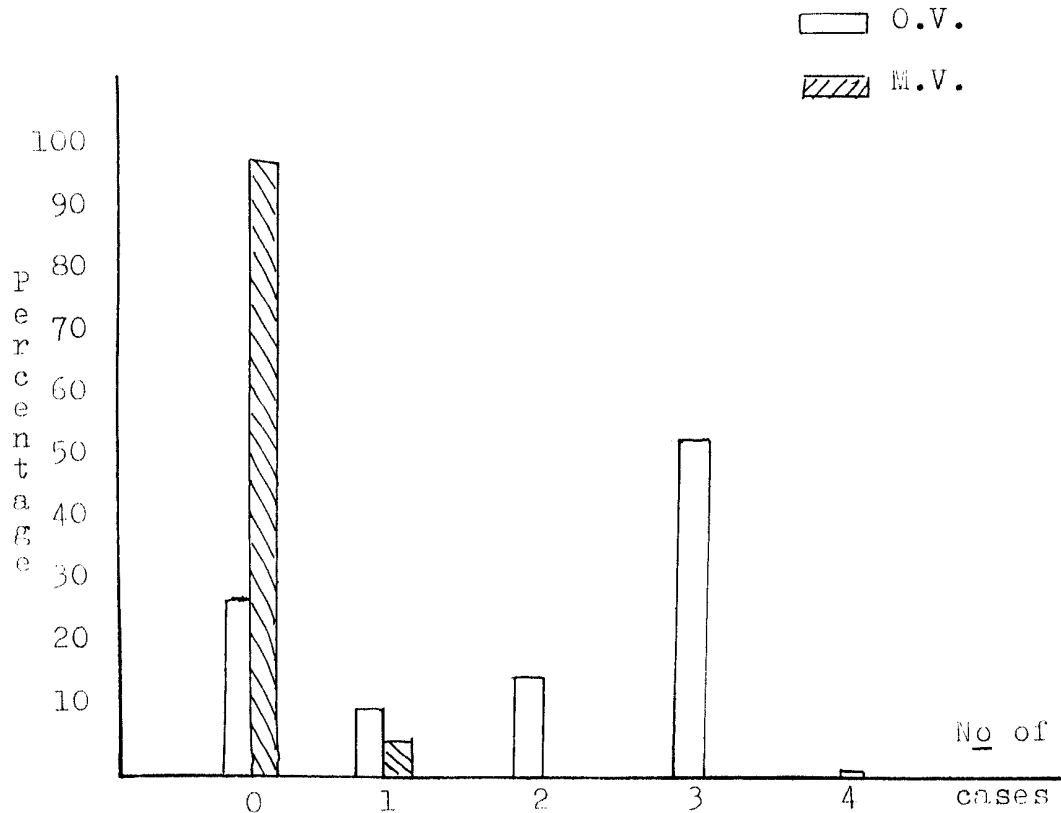
For the 1st time there was a high incidence in January reaching 10% of the total number of cases. The peak was in August with a gradual decrease towards the Winter months.

@ Sex Incidence: Tab.(46) Gr. (54).

As usual there is male preponderance, male to female ratio was 3 : 2.

Table (43): No of doses of poliovaccine received by acute polio cases attending IPR in (1990)

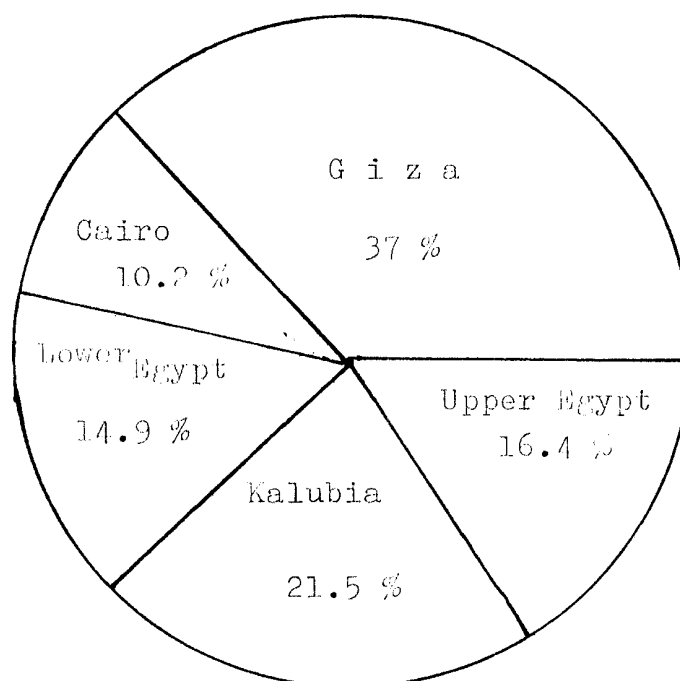
	D O S E S								
	Regular Vaccination					Mass Vaccination			
	0	1	2	3	4	0	1	2	3
No of cases	101	31	55	193	3	367	16	--	--
Percentage	26.4	8.1	14.6	50.3	0.8	95.8	4.2	0	0



Graph(50): No of poliovaccine doses received by acute cases attending IPR in (1990).

Table (44): Geographical Distribution of Acute polio Cases attending the IPR in (1990).

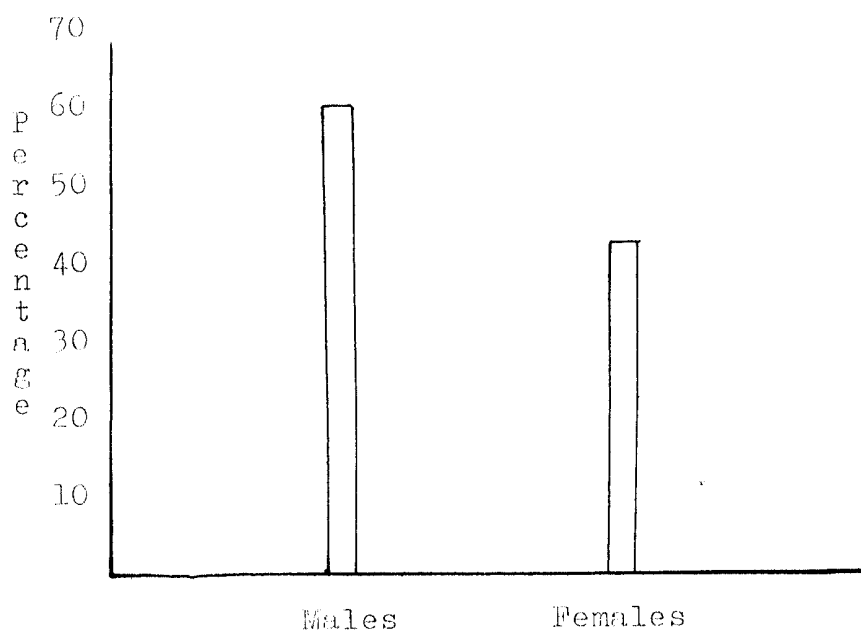
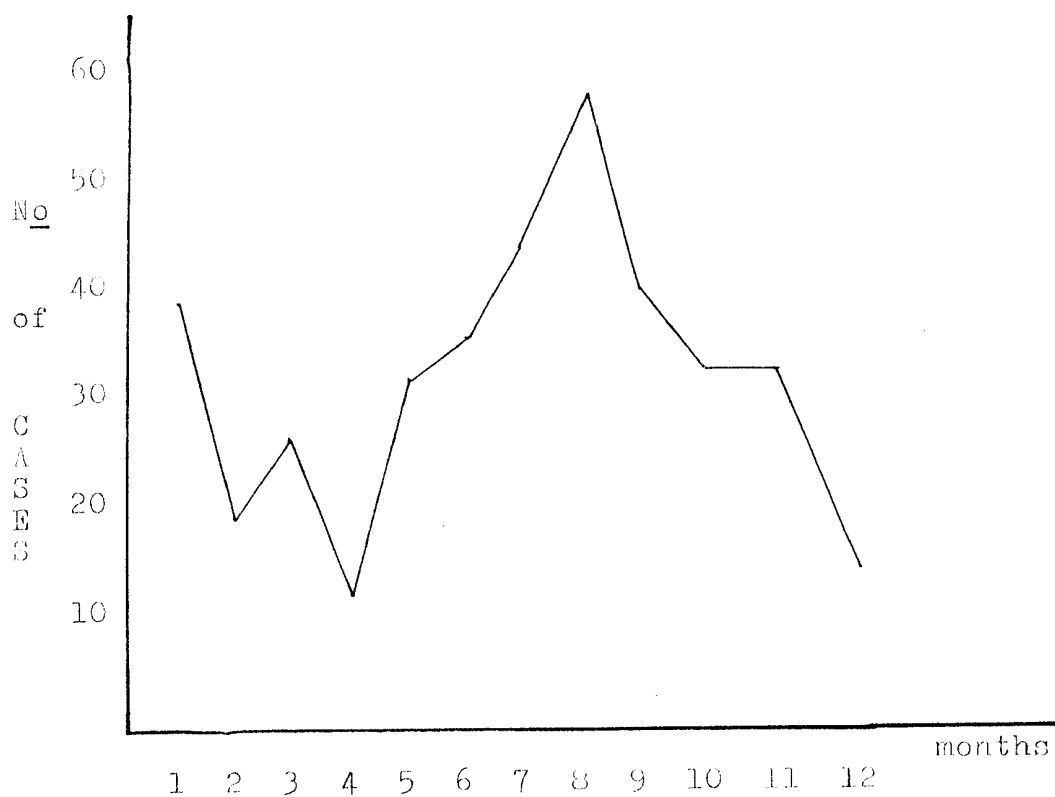
Governorate	No of cases
Cairo	39
Giza	142
Kalubia	82
Total	263
<u>Lower Egypt</u>	
Menoufia	24
Sharkia	15
Behaira	8
Dakahlia	5
Kafr-El-Sheik	1
Damietta	1
Ismailia	1
Sinai	2
Total	57
<u>Upper Egypt</u>	
Beni-Suef	14
Menia	14
Fayoum	29
Suhag	2
Kena	3
Aswan	1
Total	63
Total for Egypt	383

Graph(51): Geographical Distribution of acute cases
(1990).

Months	Males	Females	Total
January	21	18	39
February	9	10	19
March	15	10	25
April	8	4	12
May	19	12	31
June	19	16	35
July	26	18	44
August	36	20	56
September	25	15	40
October	21	12	33
November	20	13	33
December	7	9	16
Total	226	157	383
Percentage	59.1 %	40.9 %	100 %

Table (46): Seasonal & Sex Incidence of acute cases (1990).

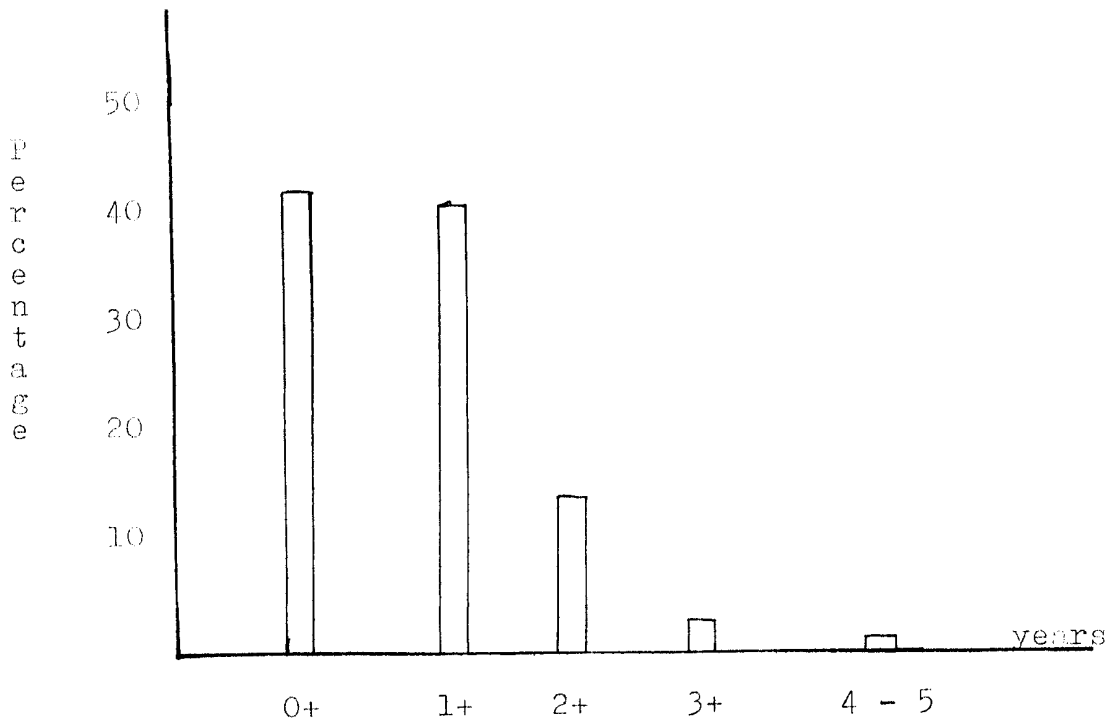
Graph (53): Seasonal Incidence of acute cases in (1990).



Graph (54): Sex Incidence of acute cases in (1990).

Table (45): Age Incidence of acute cases in (1990).

Age in years	0+	1+	2+	3+	4-5	Total
No of cases	160	154	51	11	4	383
Percentage	41.8	41	13.3	2.9	1	100 %



Graph (52); Age Incidence of acute cases in (1990)

M A T E R I A LA I DM E T H O DM A T E R I A L:

A random sample of polio cases, 100 in number, were subjected to this study in the Winter months December 1990, January & February 1991. The 100 cases were from the different stages of polio: 8 acute, 10 convalescent and 82 chronic cases. They all attended the outpatient clinic of the IPR which is by far the major rehabilitation center for receiving polio cases in Egypt. The cases were divided according to sex in the ratio 3 : 2, 60 males : 40 females with an age range between 7 months and 12 years as follows: 30 were below 2 years, 27 between 2 - 4 years (the first 4 years are the most vulnerable years), 21 cases between 4 - 8 years and 22 cases between 8 - 12 years.

Cases studied came from the different Egyptian Governorates mainly Giza (47 cases), Kalubia (20 cases) and Cairo (16 cases). The rest were distributed as follows: 5 cases from Menoufia, 3 from Dakahlia, 1 from Bahaira, 1 from Beni-Suef, 1 from Fayoum, 2 from Ikingi, 1 from Suhag, and 3 from Kena.

M E T H O D :

A questionnaire in Arabic language, composed of 55 questions in 8 papers, was given to the mothers of the 100 cases , and the answers were filled in by the researcher.

(A copy of the questionnaire is Appendix I)

The data collected were studied and analysed and showed the following results :

R E
S U L T S

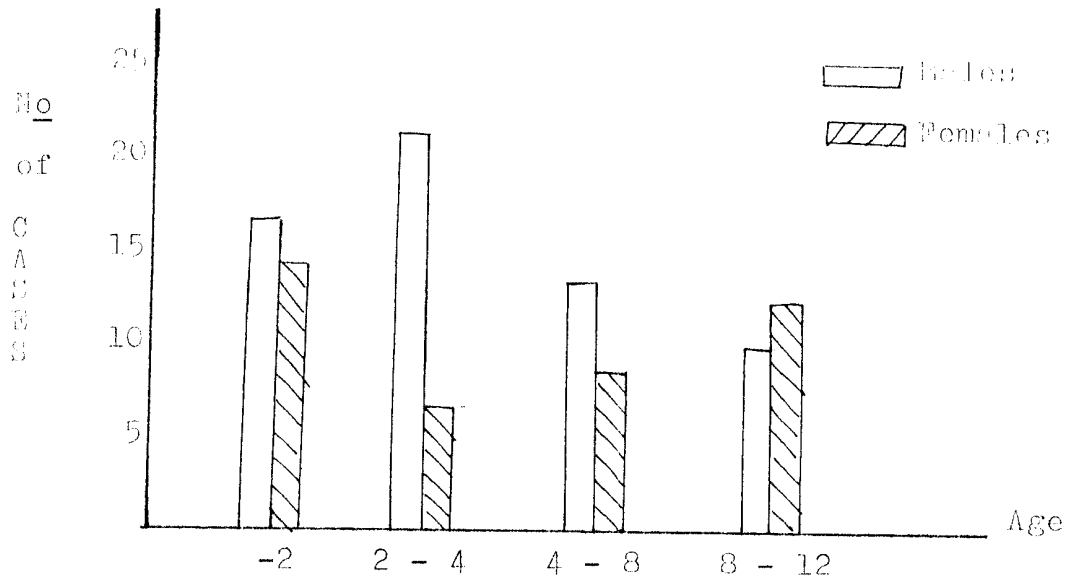
The first page in the questionnaire included 13 questions asking about the patient's Personal History in the following order:

Name, sex, age, residence, and number of rooms, then, Maternal education and work, Paternal education and work, Family income / month, Number of family members, Number of brothers and sisters and the patient's order amongst them.

The following results were obtained from the personal data:

Table (47): Age & Sex distribution in the sample.

	-2	2 - 4	4 - 8	8 - 12	Total
Males	16	21	13	10	60
Females	14	6	8	12	40
Total	30	27	21	22	100



Graph (55): Age & Sex distribution in the sample

The above table and graph show that the sample (100 cases) were distributed according to sex in the ratio 3 : 2 as 60 were males and 40 were females.

According to age 30 were below 2 years (starting from the age of 7 months) 16 were males and 14 were females, 27 cases in the age incidence 2 - 4 years, 21 were males and 6 were females, 21 cases between 4 - 8 years, 13 of which were males and 8 were females. The last age group 8 - 12 years were 22 cases 10 males and 12 females.

Table (48): Geographical distribution of polio cases in the sample.

Governorate	Females	Males	Total
Giza	18	29	47
Cairo	6	10	16
Kalubia	6	14	20
Menoufia	4	1	5
Dakahlia	2	1	3
Behaira	-	1	1
Beni-Suef	-	1	1
Fayoum	-	1	1
Menya	-	2	2
Suhag	1	-	1
Kena	3	-	3
Total	40	60	100

The above table shows that 83% of cases came from Giza, Cairo & Kalubia. This is due to the location of the IPR in Embaba, Giza. In spite of that, cases came from the different Egyptian governorates as follows: 5 from Menoufia, 3 from Dakahlia, 1 from Behaira, 1 from Beni-Suef, 1 from Fayoum, 2 from Menya, 1 from Suhag & 3 from Kena.

5 cases out of the 47 cases from Giza, came from El Kom El Ahmar- Oussim, all 5 cases had an age range 3 - 3½ years. All 5 cases were vaccinated at the village's Health Center. This indicated that the poliovaccine given to those children was not effective most probably due to bad storage.

Table (49): Maternal education and work.

	Illit- erate.	lry Sch.	high Sch.	Univer. Grad.	Total
Worker	1	--	--	--	1
Housewife	81	13	4	1	99
Total	82	13	4	1	100

As shown in the table only 1 mother was a university graduate, 4 were High school graduates, 13 were Primary school graduates while the majority 82 % were illiterate, and could not read or write. 99 % of the mothers were housewives and only one worked as a semi-skilled worker.

Table (50): Paternal education and work.

	Illit- erate	lry Sch.	high Sch.	Univer Grad.	Total
Worker	21	12	4	---	37
Farmer	14	10	---	---	24
Clergyman	--	2	7	2	11
Other	24	1	1	2	28
Total	59	25	12	4	100

Table (50) shows that 59 % of the fathers were illiterate while 25 % were Primary School Graduates and 12 % were High School Graduates and only 4 % were University Graduates. This indicates that most of the cases 84 % come from a low educational standard. As regards the paternal work : 37 % of fathers worked as workers (Skilled and non- Skilled), 24 % worked as farmers, 11% as clergymen and 18 worked other jobs e.g. merchants..etc.

Table (51): No of family members of sample cases,
+ No of rooms of house.

Members Rooms	3 - 4	5 - 6	7 - 8	more than 8	Total
1 room	9	18	10	4	41
2 room	3	6	10	2	21
3 rooms	11	5	7	2	25
More	2	5	3	3	13
Total	25	34	30	11	100

Arithmetic Mean of no of family members = 6.27

Arithmetic Mean of no of rooms = 2.1

∴ There are approximately 3 members / room.
(Abd El-Aziz, 1989).

But we should put in consideration that there were 11 cases with family members more than 8, 4 of these cases live in one room only.

There is a total of 41 cases i.e. 41 % of the sample living in a one room lodging. 21 % live in 2 rooms, 25 % in 3 rooms and only 13 % live in more than 3 rooms. The last 2 categories live mostly in rural areas where they live in large houses but together with their animals and poultry.

Table (53): Type of feeding & any chronic illnesses affecting the sample cases.

Feeding Ch. dise.	Breast	Artificial	Both	Total
Non	67	17	5	89
Br. Asthma	4	2	2	8
Mental Ret.	1	2	--	3
Total	72	21	7	100

question (14): Asked about the type of feeding the child received in his first year of life.

72 % of cases were completely breast fed, 21 % were artificially fed and 7 % were fed by both ways. This leads to another question: Who are more susceptible to the disease? breast or artificially fed? or are there other external variables affecting the incidence of the disease?

question (15): Asked if the patient suffered from any chronic or congenital disease or mental retardation.

8 % of the patients had bronchial asthma. 3 % were mentally retarded and the rest 89 % were free. This leads also to a question: Is there a correlation between bronchial asthma and decreased immunity leading to easier affection by poliomyelitis?

Table (54): Symptoms during last week before appearance of symptoms and signs of poliomyelitis.

	Females	Males	Total
Fever only	24	48	72
G.E.	3	3	6
Vomiting	2	-	2
Diarrhoea	1	-	1
Influenza	1	-	1
Bronchitis	-	2	2
Epileptic fits	1	-	1
Nothing	8	7	15
Total	40	60	100

85 % of cases suffered from some illness during the week before the appearance of the clinical picture of poliomyelitis.

72 % suffered from fever alone and were either neglected or given an antipyretic. The fever was most probably due to the viral infection of poliomyelitis and the viraemia.

6 cases had gastroenteritis, 2 had vomiting and one suffered from diarrhoea. These symptoms might have been the antecedent illness that preceded the invasion of the C.N.S. by the virus.

2 cases had bronchitis, one had an epileptic fit and 15 were completely free.

Table (55): No of cases who received an injection before the appearance of polio clinical picture and when..?!

When Injec.	3 days	3-7 days	7 days	None	Total
Yes	37	16	4	-	57
No	--	--	-	43	43
Total	37	16	4	43	100

The above table shown that 57 cases i.e. 57 % received an injection a few days before the appearance of the polio clinical manifestations. 37 cases had an IM injection 1 - 3 days before the symptoms appeared, 16 cases had the injection 3 - 7 days before the symptoms appeared and 4 cases received the injection more than 7 days before the appearance of the symptoms.

Most of the injections received were to treat the antecedent febrile illness i.e. the injections were either antipyretics or antibiotics.

3 cases had the DPT injection 1 - 2 days before the appearance of polio symptoms. Since DPT injection is usually accompanied by oral poliovaccine (TOPV), therefore the cases might have had low or immunodeficiency leading to the appearance of the symptoms post-vaccine.

By asking the mothers if their children had any heavy fall or accident prior to the occurrence of polio symptoms, only 3 cases gave positive reply showing no significant correlation between falls and polio affection (question 18).

Starting from question (21) to question (29), the questions were focused on the polio disease affection. Question (21) asked about the duration of the illness to classify the cases in stages:

Acute (around a week) and these were 8 cases,
Convalescent (around a month) and these were 10 cases,
Chronic (more than a month) and these were 82 cases.

By asking the mothers if they know the name of the disease that affected their children (question 22) 89 % answered Yes and 11% answered No. Of the 89 cases 80 mothers said that their children had poliomyelitis and 9 said they had weakness of the affected limbs or weakness of the nerves.

When the mothers were asked question (23) about who told them the child had polio, 78 % of the mothers stated that they were told by the doctor, 8 % know from their neighbours, 3 % from their relatives and 11 % did not know that their children had polio as was evident from answers to question (22).

The following question (24) about the causative agent of the disease in the mothers' opinion. Only 5 mothers i.e. 5 % said that it was a microbe, 32 % answered that the disease was the child's fate and destiny. 24 % referred the disease to the fever the child had before the polio symptoms occurred, 18 % said that the cause was the injections the children received, 6 % said that the cause was the bad vaccine, 2 % carelessness, 2 % magic and 1 % to labour induction.

Question (25) asked about the information or the mothers' knowledge about poliomyelitis. The answers to that question in particular were amazingly strange, as most of the mothers knew nothing about the disease. A few mothers said that it was a disease that disabled the children and made their lives miserable, and some mothers answered that any paralysis affected only the elderly and led to death and that they never knew before their children's affection that there was a type of paralysis that occurred in infancy and early childhood.

In answer to question (26) if the mother had heard of the disease before her child's affection, 43 % replied positively and 57 % negatively.

Only one mother had another affected child, and 99 % had healthy children (question 27). 16 % had an affected relative or neighbour (question 28).

On asking the mothers who told them about about the disease (question 29), 79 % said that they heard about it from the T.V. and 1 % from the Radio, 12 % from their neighbours or relatives, 3 % from others and 5% never heard about it before their children's affection.

The third category of questions (30 -- 39) was about obligatory vaccination. In question (30), the mothers were asked if they had ever heard about the child's routine vaccination. There were 99 positive answers and only one negative. 52 % of the mothers heard about the obligatory vaccination schedule from the T.V. advertisements, 1 % from the radio, 8 % from neighbours and relatives, 22 % knew from the child's birth certificate, 10 % from the different Health Center employes at their town or village and 6 % know from their village Mosque. (question 31).

Question (32) asked the mothers if their affected children were vaccinated or not, and surprisingly 82 % of the answers were YES and only 18 were NO.

The mothers who answered Yes were asked questions (33 & 34). Question (33) was about the type of vaccine the child received: 73 % had the BCG, 60 % had their measles vaccine and 82 % had their DPT shots and oral Poliovaccinations.

Table (56): No of doses of poliovaccine (O.V.) taken by the sample cases.

Doses Vac. Child.	0	1	2	3	4	Total
YES	-	3	5	39	35	82
NO	18	-	-	-	-	18
Total	18	3	5	39	35	100

Question (34) was to confirm whether the child took the obligatory oral poliovaccine or not and again the 82 mothers gave a positive reply.

The 82 mothers were then asked the next question (35) How many times did the child take the vaccine drops? The answers showed that 35 cases completed their vaccination schedule (4 doses), 39 cases took 3 doses and 8 cases took 1 or 2 doses.

The question that arises here is how can a child be vaccinated either completely or even partially and become affected by the virus. Sabin (1981) stated that partial immunization if properly given can give life time immunity. The answer to this question is that either the mothers were liars or the vaccine was ineffective.

The 82 vaccinated children took their poliovaccine in the nearby Health Center both rural and urban ones. None was vaccinated in a doctor's private clinic (question 36).

The mothers of the vaccinated children were asked if their children were fed less than one hour before taking their oral poliovaccine (question 37), 22 mothers answered Yes and 60 answered No.

Question (38), asked if the child was not feeling well before taking the TGPV. 5 answered positively and 77 were free. One had diarrhoea, one had cough, one had an epileptic fit and the last 2 had fever only.

The 2 who had fever developed the symptoms of polio within a few days. The question that rises here is : Were those mere post-vaccine cases? or were the children in the viraemia stage of polio and the vaccine precipitated or enhanced its incidence (question 39).

The 4th category of questions are centered around the Massive vaccination campaigns (M.V.C.) (question 40 ---- 45). The first question (question 40) asked if the mothers knew anything about M.V.C. or not. 85 gave a positive reply and 15 a negative one.

The next question (question 41) asked the mothers how did they know about it or who told them. 65 mothers said that the main source of information was the T.V.,

2 said that it was the newspapers, 5 heard from their neighbours and relatives, 4 from the Health Center, 6 from the village's Mosque and 3 heard it from a microphone that went all around the district.

Table (57): No of doses of poliovaccine taken by the sample cases in the M.V.C.

	None	1	2	3	More	Total
Yes	-	32	5	7	14	58
No	42	--	-	-	--	42
Total	42	32	5	7	14	100

Questions 42 and 43 asked the mothers if they had vaccinated their children in the M.V.C. and how many times. 58 mothers answered Yes and 42 answered No. 32 children took one dose, 5 took 2 doses, 7 took 3 doses. 14 children took more than 3 doses i.e. they were vaccinated in more than one M.V.C.

The majority of cases (57) were vaccinated in the Health Centers of their districts and villages. Only one case was vaccinated in a Doctor's private clinic.

Table (58): Poliovaccination program in T.V. viewers and whether they liked it or not. (among the case).

	Yes	No	Total
Yes	62	--	62
No	35	--	35
Did not watch	--	3	3
Total	97	3	100

The last category of questions ask about the T.V. campaign against poliomyelitis.

T.V. was chosen in particular and not other means of mass media because of the very high publicity of that device and because it entered nearly every house all around the country, its urban and rural areas, all the classes whether high or low classes and all the socioeconomic standards.

The T.V. has a country wide spread, it has a very high influence especially on the illiterates. They get most of their information through its channels and programs. The Health authorities are making use of this fact by making publicity programs on several topics e.g. Child Vaccination and Family planing.

During the M.V.C., the television has an important role, but it is still not performing its full function in making the people aware of all the facts on poliomyelitis.

The mothers were then asked if in their opinion child's vaccination was beneficial to the children (question 46) or if they thought it was harmful (question 47). 94 % of the mothers agreed that the vaccination was beneficial to their children. Only 6% disagreed as they commented that their children were vaccinated and inspite of that they caught the disease.

15 Mothers said that the vaccine was harmful as the children had a low grade fever after vaccination and were not feeling well (question 48).

Question 49, asked if the affection of the children made their mothers give the vaccine to their other siblings. 85 mothers answered positively while 15 answered negatively as their other siblings were older than the affected one, or they had no other children.

97 % of the mothers saw the T.V. publicity program against poliomyelitis, urging people to vaccinate their children especially during the M.V.C. (question 50).

62 of these mothers liked the program (question 51) because it made the people aware of the disease, and told them about the means of prevention from that wicked disease. It made people much more ready to vaccinate their children to guard against infection. (question 52).

35 mothers did not like the program because it broke their hearts to see the poor crippled children and

thought it was unhuman to make a scene of these poor children.

Question(53) asked the mothers about their feelings when they saw the T.V. polio advertisement. 47 mothers felt very sorry for their children and themselves. 21 mothers felt disgusted and resented the whole program. 13 mothers said that it did not differ whether they saw the advertisements or not and 16 mothers had different other answers e. g. that this program should be prohibited, or that it felt good to see that there are other cases like their children or worse ...etc.

The mothers were then asked question 54, what else in their opinion should the government do to guard against polio affection of the children.

24 mothers answered that the advertisements should increase in frequency. 4 said that they should increase the health programs in the T.V. and Radio.

27 mothers said that they should try face to face propaganda i.e. health personnel visiting houses talking to the mothers directly. 8 answered that there should be some sort of punishment to the parents who do not give the vaccine to their children. 37 mothers said there should be any cure for the disease.

The last question (55) asked if there was anything they would like to add. Most of the comments was that

there should be away to cure the children and that the doctors should double their efforts to find treatment for those whose fate and destiny made them catch the disease. Few answers said that doctors should not give injections to feverish children and those who do so should be condemned.

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D I S C U S S I O N

Poliomyelitis is a world wide infectious disease of human beings that probably back to earlist evolutionary times. The characteristic muscular atrophy and deformities resulting from paralysis of various muscles in early life has permitted identification of the disease from drawings made thousands of years ago. But it became a clinical entity in the 19th century. (Sabin,1981).

During the first sixty years of the present century, major epidemics of polio occurred throughout the temperate industrialized parts of the world as Europe, Australia, Northern America and Japan in the late 1950 s. The development and wide distribution of effective vaccine rapidly eliminated polio from these countries and apparently removed it as a major health problem in the world.

(Nichlas, 1983).

In the presence of crowding and poor sanitation , polio tends to be an endemic disease of early life that still carries a high burden of illness.

(Robbins & Nightingale,1983)

Therefore, the highly effective vaccination schedules of the developed countries can at best have only a limited effectiveness in the developing countries.

(Sabin , 1980)

Poliomyelitis seems to have been endemic in Egypt since ancient times. The interest of it as a disease started in the years 1951 - 1952. Since then, more interest in the disease, better diagnosis and better reporting led to show a sharp increase in the officially reported cases. (Imam and Labib, 1975)

Compulsory immunization with TOPV was introduced in 1965 and was accompanied by temporary decrease of cases, but acute cases continued to appear reaching maximum level from 1973 to 1975. This invited the public health authorities to start the first mass vaccination campaign in 1976. Three doses of TOPV were given to all infants and children from the age of four months up to the age of five years at an interval of 6 weeks. It was accompanied by temporary decrease of cases, so it was followed by other M.V.C. in 1979, 1981, 1983, 1984, 1985, 1986, 1987. The M.V.C. stopped in the years 1988, 1989. In the year 1990, it was decided to give an additional dose of TOPV in the late Winter days. This additional dose was to be given to all children from the age of two months up to 5 years.

As concluded by Schonberger (1981), these periodic M.V.C. seemed to be successful significantly reducing the incidence of the disease in Egypt, although on a temporary basis. The major evidence for this success was the 35 % to 50 % lower incidence rate of paralytic polio

between 1977 - 1979, a period with mass campaigns, compared to 1971 - 1975, a period without such campaigns, also 1986 which followed 4 successive M.V.C. was accompanied by marked decrease of cases. But still there is no radical elimination of the disease. (Ibrahim,1984)

In spite of the tremendous, honest efforts of the Ministry of Health , the number of cases was nearly stationary in the last 3 years, 1988-1990. The disease has serious after effects leaving the victim crippled both physically and physiologically, apart from the economic burden to our growing country. Adding to this the success of many countries of the world in elimination of the disease by using the same vaccine. All these facts show the importance of studying the problem hardily and doing vigorous efforts for virtual elimination of polio.

The Supreme Committee for radical elimination of poliomyelitis, which includes the most eminent Professors of Paediatrics & Polio Specialists in Egypt, is working on a scientific plan consisting of 5 main items as follows:

1. Giving an additional dose of TOPV yearly to all infants and children from the age of 2 months up to 5 years, in addition to the obligatory vaccination schedule.
2. Giving a dose of injectable poliovaccine (Salk vaccine) to all infants starting next winter, in addition to the first dose of TOPV given at the age of 2 months.

(Negotiations are going on now for importing the

Salk vaccine).

3. Follow up of any acute case, considering it to be from the dangerous category, doubling the efforts and prophylactic measures taken in its area and town, giving a booster dose to all the children below 5 years old as a mean of prophylaxis & control.
4. The continuation of massive vaccination campaigns against the disease even after its radical elimination for fear of cases coming from abroad.
5. Going on with the obligatory vaccination schedule and increasing the public campaign programs for vaccination through the various means of mass media, making the parents and adults aware of its catastrophic effects on the children, their families and the whole country.

(Al-Ahram , 1990)

For the study of the epidemiological situation of polio in Egypt, we obtain our data from the years 1980-1990 from the Institute of Polio and Rehabilitation (IPR) at Embaba, considering only the acute cases. This hospital is the most active polio center in Egypt. The patients come not only from Cairo but also from other provinces. To a very large extent, paralytic polio cases coming from Cairo, Giza and Kalubia represent mostly the main bulk of cases. Although these cases do not represent the total annual incidence in Egypt, as many cases are treated in other governmental hospitals and private clinics, they can be considered an index for the state of polio in Egypt.

Incidence Of Polio :

The data obtained from our work showed that :
There was a jump in the number of cases in 1980 to the pre-mass vaccination level (2006), there was a drop in 1981 (1613), rise again in 1982 (2113), 3 years of steady decline of cases : 1983 (1022), 1984 (699), 1985 (416), till it reached the minimum number in 1986 (339).
Another rise took place in 1987 (492), then a slow decline in 1988 (416), 1989 (384) and became stationary in 1990(383).

Studying the data supplied by the statistical department at the IPR showed that in the first half of this decade, obligatory vaccination during the first year of life was nearly nil, and infants received variable doses of the vaccine during MVC or were not vaccinated at all.

As stated in the Annual Report (1981) : there may be some defects in giving the vaccine to infants who catch the disease, most probably the vaccine was not swallowed. Sabin (1980) concluded that in economically underdeveloped countries because only a small proportion of infants are brought to well baby clinics or are visited by mobile teams, no vaccine, live or killed, even if it were 100% effective in a single dose, could be expected to have more than a limited effect in communities in which almost 40% of the paralytic cases occur during the first year of life and only a small proportion of infants rec-

eive routine immunizations during that period.

The second half of the decade showed marked significant reduction due to conduction of 6 successive annual MVC with public information program, immediately before vaccination days. Parents became aware of the serious effects of the disease, but it seemed that there were some who were still indifferent to MVC and even did not come forward or did not complete mass or routine proper vaccination. The possibility that MVC has weakened the routine proper immunization is present. Due to the still existence of the disease, routine proper immunization should be side by side with MVC. (Ibrahim ,1985). The routine program should be strengthened to the point if possible where MVC would not be necessary.

(Schonberger ,1981).

Seasonal Incidence :

The incidence of the disease in the years 1980-1990 by month does not show a clear seasonality. The disease occurs all over the year although there is a tendency to increase in Summer months. Perhaps the seasonal pattern of the disease was distorted due to unconstant time of MVC conducted throughout the years.

Geographical Distribution :

The IPR is located in Embaba - Giza, so most cases attending it were from Giza, Kalubia & Cairo (from 68.7% to 83.4% of cases).

The number of cases from Giza & Kalubia nearly represented the real number, while that for Cairo was partial, as the rest of cases were treated in University and other hospitals.

The number of cases for Lower Egypt were more than for Upper Egypt, the former being nearer to the IPR especially Menoufia and Sharkia. Most cases in Upper and Lower Egypt were treated locally in special sections in University or governmental hospitals.

(Annual Report , 1980).

Age Incidence & Sex Distribution :

The disease was still maintaining its infantile character although the year 1983 showed slight increase in number of cases above 4 years, and the year 1988 showed 3 cases above the age of 10 years.

Most cases through the decade were below 2 years, this denotes the very early exposure to the disease and still inadequacy of our protective programs.

There was male to female preponderance with the ratio of 3:2 or 4:3 throughout the years of the study.

A questionnaire was given to the mothers of 100 cases attending the IPR outpatient department.

The answers to the questions revealed several facts :

1. The cases came mostly from low socio-economic classes. 82% of the mothers & 59% of the fathers were illiterate. 41% of the cases lived in a one-room lodging, 11 cases had a number of family members more than 8 . The arithmetic mean of number of family members in the cases studied \approx 6.27 . The arithmetic mean of number of rooms \approx 2.1 . Thus the mean was 3 members / room. (Abd-El-Aziz, 1989). The mean monthly income was 149.67 L.E. So the mean was 23.85 L.E./ member /month . There were 38 families with a monthly income below 100 L.E.
2. 72% of cases were breast fed i.e. breast milk did not give enough immunity to the children.
3. 85.% of cases had obvious antecedent illness mostly fever alone (72%) and (9%) had GIT symptoms in addition to the fever e.g. vomiting, diarrhoea...etc. 57 cases received an injection a few days prior to

frank polio symptoms i.e. flaccid paralysis with preservation of sensation.

4. 89% of the mothers knew that their children had poliomyelitis but they had no real information about the nature of the disease.

As regards the causative agent only 5% said that it was a microbe, the rest said it was the child's fate and destiny or God's will.

Answers to question 25 revealed complete ignorance of the mothers as regards what is polio. Although some of the children had polio for several years, their mothers did not know that polio was an infectious disease, they did not know its mode of transmission. The only thing they knew was that it disabled the children, and that it was not true paralysis as the sensation was preserved and paralysis usually affected the elderly people only. In short, the mothers had no "Health Education" even about the disease they live with for a lifetime.

5. All the mothers (except one) knew about the obligatory vaccination (O.V.) schedule mainly from the T.V. advertisement program & the birth certificate.

82% of the cases were vaccinated, 35% took their 4 doses (i.e., COMPLETE vaccination) & 47% were partially vaccinated (1-3 doses). Sabin (1981), stated that

proper vaccination with TOPV could give solid lifetime immunity even if the child took 1 dose .

This denotes that either the children did not swallow the vaccine properly or the vaccine efficacy was low due to bad storage or bad handling.

6. 85% of the mothers heard about massive vaccination campaigns (MVC) mostly from the T.V.as their main source of information.

58% of the mothers participated in the MVC although their children had contracted the disease, in fear that their physical condition might worsen if they did not take the vaccine.

As apparent from their answers on the different items of the questionnaire, the mothers whether illiterate or not, knew nothing about the disease "Poliomyelitis" except that it was a disabling disease. People cannot beware things they know nothing about, so here comes the role of mass media to perform its very important and effective informative functions, people in general must learn more about how to keep themselves healthy & strong.

(Schramm , 1960).

Hodgdon (1971), said that if we expected our campaigns to succeed and our information to be effective,

then (1) we should base the whole campaign on an understanding of the life, beliefs and attitudes of the laymen, and the social factors that help to determine how they live,

(2) we should provide face-to-face communication with field workers or other individuals who understand the villagers & small town dwellers as well as the dynamics of social change, and use the mass media to support and extend the work of this field staff,

(3) we should use a combination of communication channels, employing each in such a way and at such a time as to contribute most to the total usefulness of the information.

Psychologists have got 2 major roles to play. The 1st is in the protection & prevention programs. Studies should be made on the community the program is going to be presented to in order to provide the suitable information and counselling which could be really effective.

The 2nd role is in the Health Centers and Rehabilitation Centers where the already handicapped poliomyelitis children go to seek therapy. Therapy should not be only physical or surgical but should be accompanied by psychological assessment of the child and his family to give them the necessary support, reinforcing the good attitudes

and giving the needed psychological counselling to overcome their disabilities, as these children and their family members are very vulnerable to psychiatric diseases and disorders especially depression.

Further studies are needed to clarify the efficacy of our preventive programs .

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S U M M A R Y

Paralytic polio is considered one of the most important public health problems in Egypt.

This work was conducted to study the epidemiology of polio amongst Egyptian children. Acute paralytic cases attending the Institute of Polio & Rehabilitation at Embaba annually through the last decade were subjected to this study. These cases can be considered as an index for the state of polio as the IPR is the major center receiving paralytic cases in Egypt.

The data obtained showed that there was a jump in the number of cases during the year 1980 even to the pre-mass vaccination level, there was slight drop of cases in 1981, very high incidence in 1982 which continued during the early 1983. But the rest of the year and the following 3 years showed steady decline of cases with the lowest incidence in 1986, another rise in 1987 and then steady decline in the following 3 years.

Most cases attending the IPR were from Giza, Cairo and Kalubia, more cases from Lower than Upper Egypt.

The disease occurred all over the year with a slight tendency to increase in summer months.

The disease in Egypt, as seen from the study, still maintained its infantile pattern. Most cases were below

2 years old, which denoted the very early exposure to the disease and inadequacy of our protective program. There was still male female preponderance with 3:2 ratio.

The questionnaire given to the mothers of 100 cases attending the outpatient department at the IPR revealed the following facts :-

- @ Most of the cases came from low socioeconomic standards.
- @ 35 % of cases were completely vaccinated & 47% were partially vaccinated and in spite of that they contracted the disease.
- @ The important informative functions of mass media & T.V. in particular although the publicity programme should contain some sort of Health Education & information about the nature of the disease they fight. People cannot get rid or runaway of something they donot know anything about.

Thus poliomyelitis in Egypt still constitutes a major health problem. Uptill now, there is no radical elimination of the disease despite the success of Mass Vaccination Campaigns in reducing the incidence of the disease when properly organised. There are vigrous efforts for the virtual elimination of polio by 1994, will it succeed ?

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ملخص البحث

يصاب الإنسان بمرض شلل الأطفال عن طريق ابتلاع أحد أنواع الفيروسات الشكّ المسببة له . ويبدو أن المرض كان متوطنا في مصر منذ زمن قديم ، فقد ظهر في مخطوطات وصور قدماء المصريين . وقد بدأ الاحساس بخطورة المرض في الأربعينات والخمسينات من هذا القرن ، وذلك نتيجة ازدياد عدد الحالات الاصابة بين الأطفال .

ولتوطن المرض في مصر ، لم ينتشر بصورة وبائية لأن الأطفال والرضع كانوا معرضين لأنواع فيروس شلل الأطفال الثلاثة منذ مولدهم وبالتالي اما انهم اصابوا بالمرض أو اكتسبوا مناعة مبكرة .

١ وعلى الرغم من التطعيم الاجبارى لشلل الأطفال منذ أكثر من ٢٥ عاما إلا أنه ، مازال يمثل احدى المشكلات الصحية العظمى في مصر .

فلمرض شلل الأطفال آثار نفسية واجتماعية سيئة على المصاب وأسرته بالاضافة الى أثره على الاقتصاد المصرى نتيجة لاعاقة المصابين به والتكاليف الباهظة لاعادة تأهيلهم .

وقد أوضحت هذه الدراسة ان الاصابة بفيروس شلل الأطفال تزداد قليلا في شهور الصيف ، وخاصة في السنتين الأولتين من العمر ، كما أن هناك ارتفاعا في الاصابة بين الذكور عن الاناث بنسبة ٣ : ٢ .

تم الحصول على المعلومات والبيانات من قسم الاحصاء بمعهد شلل الأطفال بامبابسة ، وهو يعد أكبر مركز متخصص لعلاج واعادة تأهيل مرضى شلل الأطفال ، وهو يستقبل مرضاء من جميع أنحاء الجمهورية خاصة محافظات القاهرة الكبرى (القاهرة - الجيزة - القليوبية) .

وقد بدأت الحملات القومية للتطعيم ضد شلل الأطفال مع نهاية عام ١٩٧٦ ، وعلى الرغم من هذا فقد ظل هناك ارتفاعا ملحوظة في عدد الحالات المتكررة على معهد شلل الأطفال بامبابسة بعد انخفاض طفيف عام ١٩٧٧ ، فقد وصل عام ٢٠٠٦ حالة عام ١٩٨٠ ، ثم تلاء انخفاض آخر عام ١٩٨١ ، وارتفاع آخر عام ١٩٨٢ وبداية ١٩٨٣ ، وهذا بدأ انخفاض مستمر في عدد

الحالات حتى وصل ٣٣٩ حالة عام ١٩٨٦ ، تبعه ارتفاع أخير عام ١٩٨٧ ثم انخفاض فى السنوات الثلاث التالية حتى عام ١٩٩٠ حيث وصل العدد الى ٢٨٣ حالة .

وقد طرح استبيان على أمهات ١٠٠ حالة متروكة على العيادات الخارجية لمعهد شلل الأطفال ، وقد أوضحت نتائج الاستبيان الحقائق الآتية :

- معظم الحالات من مستوى اقتصادى اجتماعى منخفض .
 - ٣٥% من الحالات أنهموا تطعيمهم الاجبارى ، و ٤٧% حصلوا على عدد من الجرعات يتراوح بين ١ - ٣ جرعات ، وعلى الرغم من ذلك فقد أصيبوا بالمرض .
 - جهل الأمهات التام بمهنية المرض حتى المتعلقات منهن .
 - الدور الهام الذى يلعبه الاعلام وخاصة التلفزيون فى التوعية عن طريق الاعلانات والبرامج الصحية ، والتى يجب أن تحتوى على قدر من الثقافة الصحية والمعلومات البسيطة عن المرض المقصود محاربة فاناس لاتستطيع مواجهة أو التخلص من شىء لاتعرفه .
- وقد اهتمت السلطات بمحاربة شلل الأطفال والقضاء عليه قضاء مبرما مع نهاية ١٩٩٤ ، ولذا قد شكلت "اللجنة العليا للقضاء على مرضى شلل الأطفال" من كبار أساتذة طب الأطفال وكبار المتخصصين فى مجال شلل الأطفال لوضع خطة للقضاء على المرض نهائيا .

هناك جهود ضخم يبذل لانجاح هذه الخطه ويحتاج الى تضافر جهود المخلصين من المتخصصين فى مجالات عديدة أهمها الصحة والاعلام لتحقيق حياة أفضل للطفل المصرى بدون اعاقه .

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- ٢- جنس الطفل :
- ٣- سن الطفل :
- ٤- الحي السكني :
- ٥- عدد حجرات السكن :
- ٦- المستوى التعليمي للأم :
- ٧- عمل الأم :
- ٨- المستوى التعليمي للأب :
- ٩- عمل الأب :
- ١٠- دخل الأسرة الشهري بالتقريب :
- ١١- عدد أفراد الأسرة :
- ١٢- عدد الأخوة والأخوات :
- ١٣- ترتيب الطفل بين إخوته :

١٤ - اسون الرذاعة :

. رضاعة طهيمة .

. رذاعة صناعمة .

١٥ - امابة الابل باى امراض مزمنة :

. ربو شمسي .

. دن .

. امراض القلب .

. مكر .

. تخلف عقلسي .

. غيرهما . اذكر

١٦ - امراض الابل باى مرض قبل ظهور اعراض المرض الحالى باسموع ؟

. نعم . اجب عن ١٧

. لا .

١٧ - ما هو المرض السابق على ظهور اعراض المرض الحالى ؟ . سخونة .

. قسي .

. اسهال .

. نزلة معوية .

. نزلة شمعية .

. انفلونزا .

. غيرهما . اذكر

١٨ - عد امراض الابل لاي حادثة قبل ظهور المرض ده ؟

. حادثة تصادم .

. وقمة شديدة .

. خبطة قوية في احد الاطراف .

١٩- عدد اطفال حقة قبل ظهور المرض ؟ نعم لا

لا

٢٠- عدد الافة بل مايميا بقدا ايه ؟ ا. اقل من ٣ ايام .

ب. من ٣ - ٧ ايام .

ج. اكثر من ٧ ايام .

د. اسبوع .

٢١- الطول عيمان من امتى ؟

هـ. شهر .

و. اكثر من شهر .

٢٢- انش عارفة سوعيان بايه ؟

ز. نعم ا. اكثر

لا

٢٣- من اللى نال له انه عنده شلل اطفال ؟

ح. زوجته .

ط. احدى الحارات .

ث. احدى الاقارب .

ج. الحكيمه .

د. الطبيب .

هـ. غيره و. اكثر

ز. ميكروب .

٢٤- تفحصوا اذ سبب المرض ده ؟

ح. اهـ مال .

ط. سحر او عمل .

ث. قضاء وقدر .

ج. ما

٢٥ - تعرفى ايه من شلل الأطفال ؟

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.....

٢٦ - لى تعرفى حاجة عن المورده قبل ما يعبا بيه ابنك؟ نعم

لا

٢٧ - هل عندك طفل تانى مصاب بالمورده ؟

نعم

أذكر من

لا

٢٨ - از تعرفى حد من الأقارب أو الحيوان مصاب بيه؟

نعم

أذكر من

لا

٢٩ - سمعتى عن المورده من ميين [؟] الأقارب

الحيوان

الراديو

التلفزيون

الجرائد

غيرها أذكر من

٣٠ - سمعتى عن تطعيم الأطفال ؟

نعم

أجب عن ٣١

لا

٣١ - سمعتى عن التطعيم من ميين ؟

الأقارب

الحيوان

الراديو

التلفزيون

الجرائد

غيرها أذكر من

٣٢ - هل الممنوع ايضاً / يتسببك ؟

. نعم أجاب عن ٣٢ ، ٣٤

. لا .

٣٣ - ايه التاميمات اللي أخذها ؟

. ضد السل .

. الثلاثي .

. ضد شلل الأطفال .

. الحصبة .

. الحنك الشوكية .

. غيره - اذكر

٣٤ - عدد غذاء التعميم ضد شلل الأطفال ؟

. نعم أجاب عن ٣٥ - ٣٩

. لا .

٣٥ - نسبة الامم المتحدة :

. مرة واحدة .

. مرتين .

. ٣ مرات .

. ٤ مرات .

. الوحدة الصحية .

. مكتب الصحة .

. وحدة رعاية الأمومة والطفولة .

. عند طبيب خاص .

٣٦ - أعدد النقط فيمن ؟

. غيرهم . اذكر

. نعم .

. لا .

٣٧ - هل ناز الدافل واكل قبل التعميم بأقل من ساعة ؟

٣٨ - هل كان الراحل ترمبان قبل ما ياخذ نقط التظيم ؟ . نعم . . لا .

. لا .

. مخونة .

. زكام وبسر .

. قسى .

. اسهال .

. كحسة .

. غيرها . . أنكر .

٤٠ - سمعتى عن حملة التظيم ضد شلل الأطفال ؟ . نعم . . أجيب عن ٤١

. لا .

. الأقارب .

. الحيران .

. الراديو .

. التليفزيون .

. الجرائد .

. غيرها . . أنكر .

٤٢ - سمعتى ابناك منها ؟ . نعم . . أجيب عن ٤٣

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٤٤ - مميته في الحملة كدام مسرة ؟

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٠ مرتين .

٠ ٣ مرات .

٠ أكثر .

٠ الوحدة الصحية .

٠ مكتب الصحة .

٠ وحدة رعاية الأمومة والطفولة .

٠ عند طبيب خاص .

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٤٧ - تطعيم التطعيم مكن يضر الطفل ؟

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٤٨ - يجبره اترأى ، يعميل ايه فى الطفل ؟

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٥٠ - شغرى اعلانات التطعيم ضد شلل الأطفال فى التليزيون نعم اجب عن ٥١

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٥١ - عجبك الاعلانات ؟

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٠ لا .

٥٢ - ايه شعورك وانت بتشوف فيها بعد مرض ابنك / بنتك ؟

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٥٣ - ايه شعورك وانت بتشوف فيها بعد مرض ابنك / بنتك ؟

• شعور بالحزن والندم •

• شعور بالضيق والقرف من الاعلان •

• مش فارق معاكسي •

| | • غير اذكر

٥٤ - تقدر ايه اللي ممكن الحكومة تعمله تانى عشان تحمي الأطفال من المرض ده ؟

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| | • يكتروا البرامج الصحية فى الراديو والتلفزيون •

| | • يملوا نوعية شخصية للسناك فى الميوت •

| | • يملوا غرامة كبيرة على اللي مش بيظلم طفله •

| | • غير اذكر

٥٥ - ايه حاجة تسمى تزوديتها فى الموضوع ده ؟

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.....

جامعة عين شمس
معهد الدراسات العليا للطفولة
قسم الدراسات الطبية

" مرضى شلل الأطفال في مصر خلال الأعوام العشر الماضية "

بحث مقدم من

الطبيبة / سامية سامي عزيم

للحصول على درجة الماجستير

في دراسات الطفولة

(قسم الدراسات الطبية)

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للطفولة (القسم الطبى)

(١٩٩١)

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